

COUNTY OF HAWAII GENERAL PLAN



FEBRUARY 2005
(As Amended)

COUNTY OF HAWAI‘I

GENERAL PLAN



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INTRODUCTION

1.1 PURPOSE OF THE GENERAL PLAN

The County of Hawaii's General Plan is the policy document for the long range comprehensive development of the island of Hawaii. The purposes of the General Plan are to:

- Guide the pattern of future development in this County based on long-term goals;
- Identify the visions, values, and priorities important to the people of this County;
- Provide the framework for regulatory decisions, capital improvement priorities, acquisition strategies, and other pertinent government programs within the County organization and coordinated with State and Federal programs.
- Improve the physical environment of the County as a setting for human activities; to make it more functional, beautiful, healthful, interesting, and efficient.
- Promote and safeguard the public interest and the interest of the County as a whole.
- Facilitate the democratic determination of community policies concerning the utilization of its natural, man-made, and human resources.
- Effect political and technical coordination in community improvement and development.
- Inject long-range considerations into the determination of short-range actions and implementation.

1.2 HISTORY OF THE PLAN

General Plan studies in the County of Hawaii were initiated in the late 1950's and were limited to particular regions of the island such as the Hilo, Kona, Kohala, Hamakua, and Puna Districts. As such, these initial general plans lacked a comprehensive, coordinated, and integrated overview of the entire County. The first of these studies, "A Plan for Kona", was completed in 1960 and encompassed the districts of North and South Kona. "A Plan for the Metropolitan Area of Hilo" was completed in 1961 for the districts of South Hilo and Puna. "The Kohala-Hamakua Region General Plan" was completed in 1963 and covered part of the district of North Kona and the districts of North and South Kohala, Hamakua and North Hilo. These regional plans were adopted by Ordinance No. 317 in July 1965, as the General Plan for the County. The district of Ka'u was the only area in the County not covered by this plan.

§1.2: History Of The Plan

With the adoption and ratification of the County Charter in 1968, the General Plan emerged as a major policy document. Section 3-15 of the County Charter states:

"The county council shall adopt by ordinance a general plan which shall set forth the Council's policy for long-range comprehensive physical development of the County. It shall contain a statement of development objectives, standards and principles with respect to the most desirable use of land within the County for residential, recreational, agricultural, commercial, industrial, and other purposes which shall be consistent with proper conservation of natural resources and the preservation of our natural beauty and historical sites; the most desirable density of population in the several parts of the County; a system of principal thoroughfares, highways, streets, public access to the shoreline, and other open spaces; the general locations, relocations and improvement of public buildings; the general location and extent of public utilities and terminals, whether publicly or privately owned, for water, sewers, light, power, transit and other purposes; the extent and location of public housing projects; adequate drainage facilities and control; air pollution; and such other matters as may, in the Council's judgment, be beneficial to the social, economic, and governmental conditions and trends and shall be designed to assure the coordinated development of the County and to promote the general welfare and prosperity of its people.

(a)The Council shall enact zoning, subdivision, and other such ordinances, which shall contain the necessary provisions to carry out the purpose of the General Plan.

(b)No public improvement, project, subdivision, or zoning ordinances, shall be initiated or adopted unless the same conforms to and implements the General Plan.

(c)Amendments to the General Plan may be initiated by the Council or the Planning Director."

The first General Plan document to be completed after the ratification of the County Charter in 1968 was adopted by ordinance on December 15, 1971 by the County Council. Upon adoption of the General Plan in 1971, the Council laid the foundation for establishing a comprehensive planning program for the County of Hawaii. This program consists of three interrelated parts arranged in a hierarchy as described below and illustrated in Figure I.

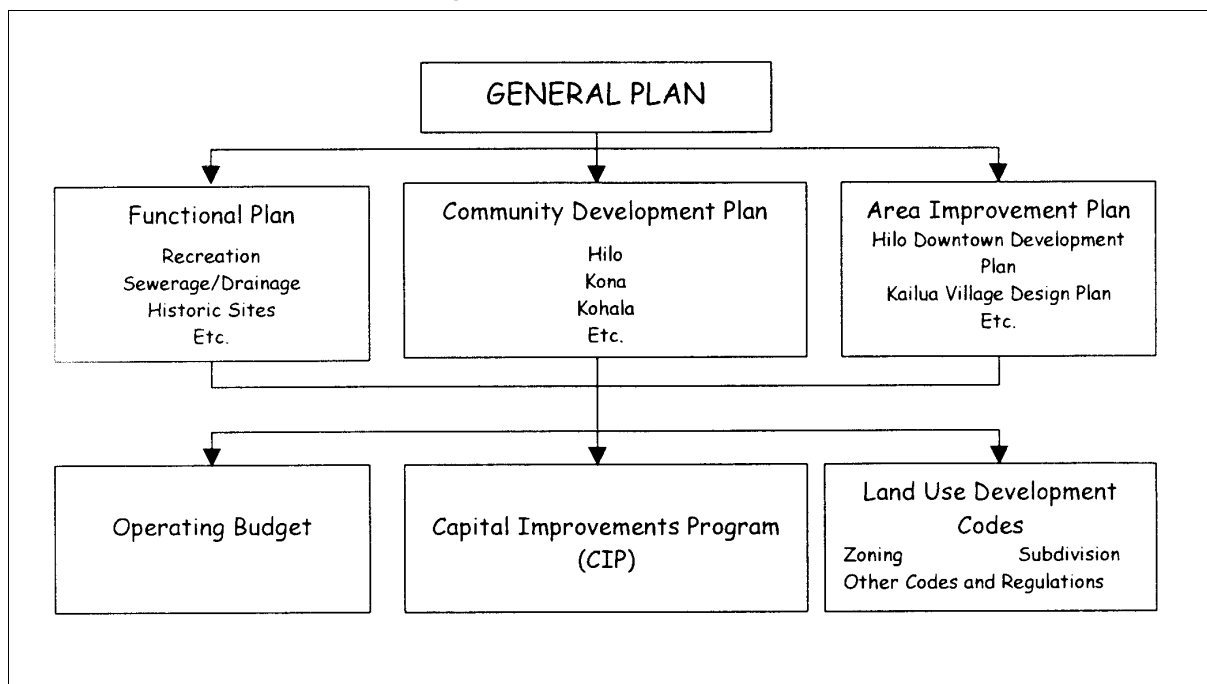
The General Plan represents the first level and encompasses long-range goals, policies, standards, and courses of action for the entire County. The General Plan also provides the legal basis for all of the other elements of the County's planning structure. As such, the General Plan is the highest order, or "umbrella" plan. It establishes the outer limits or boundaries within which the County must operate.

§1.3: General Plan Program

The second level consists of short and middle range plans that further define the long-range goals and policies of the General Plan. These plans are related to specific regions or districts (Hilo, Kona, Kohala, Ka'u, etc.), functions (recreation, agriculture, drainage, highways, etc.), and specific areas within a region (Kailua-Kona, Downtown Hilo, etc.).

The third level consists of specific mechanisms to implement the two higher levels of the planning hierarchy. These include the Zoning and Subdivision Codes and both the operating and capital improvement program budgets.

Figure 1-1. General Plan Components



1.3 GENERAL PLAN PROGRAM

The initial development of the General Plan program, undertaken between 1968 and 1970, was funded through an agreement between the County of Hawaii and the U.S. Department of Housing and Urban Development through the former State of Hawaii Department of Planning and Economic Development (currently the State Department of Business, Economic Development and Tourism). The initial General Plan study program was conducted over a 36-month period and completed by the Planning Department with the technical assistance of professional consultants in the fields of drainage and flood control, historic sites, sewerage, economics, and water.

§1.4: The Current General Plan Comprehensive Review Program

The General Plan program is structured to investigate, analyze, and evaluate concurrently all aspects of the County under a common or standard methodology. The preparation of the General Plan involves the process of planning and provides the opportunity to broaden the base of citizen participation, review, and understanding.

The 1971 General Plan required five and ten year comprehensive reviews and updates. The reviews and updates are intended to maintain the dynamism and flexibility of the General Plan and to accommodate major changes and trends that may occur within the County. The County initiated a review of the Land Use Pattern Allocation Guide Map in 1978 that led to several changes to the map. Other changes included the addition of an Energy element and amendments to procedures for the comprehensive reviews and proposals for specific amendments to the General Plan.

The first comprehensive ten-year review of the General Plan was initiated by the Planning Department in the mid-1980's and completed with the adoption of Ordinance No. 89 142 by the Hawaii County Council on November 14, 1989. This comprehensive revision program resulted in various revisions to supporting data as well as to the individual study elements and Land Use Pattern Allocation Guide and Facilities maps.

1.4 THE CURRENT GENERAL PLAN COMPREHENSIVE REVIEW PROGRAM

The planning process utilized for the current comprehensive review and revision of the General Plan included an assessment of the General Plan elements relative to new data, laws, and methods of analysis. Each study element was then analyzed and evaluated in relation to all other elements, County and district goals, and the land use pattern. Potentially, a change in one element could affect other elements as well as the land use pattern. Similarly, a change in County and district goals could potentially be reflected in all elements and in the land use pattern.

The comprehensive review of the General Plan gathered and assessed the data related to each element to identify present conditions and problems and future possibilities. The study elements utilized in the General Plan included the following:

Economic: Describes the human, capital, and natural resources used to produce goods and services for consumption in local and overseas markets.

Energy: Describes the energy situation for the County and explains the incentive for promoting energy conservation and the development of indigenous energy resources including solar, wind, hydrologic, and geothermal.

Environmental Quality: Identifies the factors affecting the island's environmental quality and describes the precautions and safeguards necessary to maintain and im-

§1.4: The Current General Plan Comprehensive Review Program

prove the quality of the environment for the physical, psychological, and social well-being of residents and visitors.

Flooding and Other Natural Hazards: Pertains to the conservation and protection of life, improvements, and natural resources from excess runoff due to either man-made improvements, natural causes, or inundation from tsunamis and heavy seas.

Historic Sites: Identifies sites and buildings of historical and cultural importance.

Natural Beauty: Identifies areas of unique natural beauty that are a principle asset of the island, and encourages programs for their conservation, preservation, and integration with other elements.

Natural Resources and Shoreline: Describes the valuable and often irreplaceable natural assets of the island and encourages programs for their proper management and protection.

Housing: Addresses the requirements for and the quantity, quality, and distribution of housing units in the County. This element also addresses critical housing problems of the County.

Public Facilities: Pertains to the location and distribution of facilities for education, public safety, social, health services and other government operations.

Public Utilities: Describes the distribution of power, light, and water; the collection and disposal of solid waste and sewage; and the provision of other communication utilities that are essential to the efficient functioning of a community.

Recreation: Examines the requirements of the County for active and passive outdoor activities, cultural events and pastimes, as well as attendant facilities and areas.

Transportation: Describes the requirements for air and water transport terminal facilities linking the County with the rest of the State and overseas areas, and the island's network of streets, highways, and roads.

Land Use: Studies the relationship of human activities to the uses of land and the location, spatial relationship, and topography. This element is subdivided into the following designations according to uses:

Agricultural: Encompasses all types of agricultural endeavors and specified industrial uses, residential and ancillary community and public and accessory uses.

Commercial: Comprised of industries in the retail trade and service categories and certain non-noxious enterprises from other industrial classifications.

§1.4: The Current General Plan Comprehensive Review Program

Industrial: Includes uses that may not be compatible with commercial areas (such as manufacturing and processing, wholesaling, large storage and transportation facilities, power plants, and government baseyards) as well as other industrial, manufacturing, or wholesaling uses.

Multiple Residential: Includes duplexes, apartments, town houses and similar types of residential structures and ancillary community and public uses.

Open Space: Includes conservation lands, forest and water reserves, natural and scientific preserves, and potential natural hazard areas.

Public Lands: Includes Federal, State, County, and University owned lands.

Resort: Consists primarily of areas with basic amenities and attributes that attract developments of visitor accommodations and related facilities.

Single-Family Residential: Consists of single-family detached houses and ancillary community and public uses.

Each study element has been divided into sections described below.

Introduction and Analysis: Describes the element and summarizes findings, County-wide characteristics and features, trends, changes, and problems, as well as the outlook and opportunities for the immediate and distant future. The analysis also addresses the element's interrelationships with other elements.

Goals: Indicates the desired long-range directions and situations enunciated by community groups, officially expressed in the past or implied in governmental programs. Provides a cohesive and comprehensive framework for the coordination of social and economic programs and governmental effort.

Policies: States the methods or strategies that should be undertaken to attain the stated goals. These are action and program oriented and involve the formulation of standard procedures, program evaluation and review, rules and regulations, ordinances and laws, budgeting, specific projects, etc.

Standards: Concerned with qualitative and quantitative criteria by which situations can be evaluated or benchmarks established. Standards are basically "yardsticks" or indicators, minimum conditions or levels of quality necessary for the well-being of the public.

Courses of Action: Many study elements require a more precise and definitive discussion of community concerns and problems. These sections attempt to identify specific alternatives on a community, district or regional basis.

As an aid to the understanding of the inter-relationship of the components of the General Plan, the separate elements of the General Plan may also be described as follows:

- The Introduction and the Economic element describe the foundations and factors that generate population and economic opportunities and growth on the island of Hawaii.
- The Environmental Quality, Energy, Flooding and Other Natural Hazards, Historic Sites, Natural Beauty, and the Natural Resources and Shoreline elements describe those natural and social conditions that influence and set parameters for development opportunities on the island.
- The Housing, Public Facilities, Public Utilities, Recreation, and Transportation elements describe those services, facilities, and improvements necessary to accommodate the growth of population and support the economy.
- The Land Use element describes the distribution, pattern, and location of the various activities addressed in the other elements of the General Plan.

1.5 COUNTY PROFILE

The County of Hawaii encompasses the island of Hawaii, which is the southeastern-most and largest island of the Hawaiian archipelago. The land area of the County is approximately twice the combined land area of all the other islands of the State.

The island of Hawaii has a diverse climate, topography and scenic beauty. Environments include dense tropical forests; majestic snowcapped mountains; active volcanoes; black, white, and green sand beaches; deeply eroded valleys; and large expanses of grazing land. Each district provides a variety of settings for human activity, land and resource utilization, or wilderness areas of minimal human intrusion.

The County of Hawaii has expanded into new fields of industry such as astronomy, high technology, renewable energy, health and wellness, agricultural and eco-tourism, diversified agriculture and aquaculture. The County's continuing support of research and development in these emerging fields will ensure a promising future for the island's economy and its residents. Specific examples include the establishment of the Agricultural Research Center of the Pacific, conversion of the old sewer treatment plant near Puhi Bay in Hilo to an aquaculture facility, and the construction of an agricultural water system in Ka'u.

The County's overall economic outlook remains mixed due to the County's dependence on the condition of the State's economy. Since 1990, the State's economy has been in a period of decline. While there are opportunities for expansion into new and existing industries, external factors such as the world economy may have an impact on the County's future economy.

§1.5: County Profile

Throughout the County's history, agriculture has played an important role in the County's economy. In the late 1700's, Hawaii's agricultural industry began by provisioning ships. During the 1800's, sugar production and cattle ranching emerged as leaders of the modern agricultural industry. These industries dominated the island's economy and social fabric well into the 1900s. The 1980's and 1990's saw the demise of sugar cultivation and the steady decline in cattle production. These once dominant industries have been replaced by fully diversified agriculture including flowers and nursery products, coffee, macadamia nuts, tropical fruits, vegetable crops, orchards, aquaculture, and forestry. Import replacement and expansion of export products and markets are increasing. The three leading agricultural industries within the County are flowers and nursery products, vegetables, and macadamia nuts. Combined, these three agricultural industries accounted for over 50 per cent of the total value of agricultural production in the County in 1997. When compared statewide, the County of Hawaii produces 35 per cent of fresh vegetables, 72 per cent of bananas, 30 per cent of coffee, 95 per cent of macadamia nuts, and 51 per cent of flowers and nursery products. Agriculture's future remains favorable with the strong diversification and development of new export protocol and technology.

Within the past forty years, tourism has emerged as the primary economic activity on the island. Much of the economic growth experienced during this period can be linked with the expansion of the visitor industry. Both the statewide and local economies have been faced with an economic downturn since 1990. Visitor arrivals to the island peaked in 1991 at 1,189,000 and subsequently declined to a low of 1,079,000 in 1994 before rebounding to 1,286,000 in 1998. The mainland economic recession of the early 1990's and the Asian economic crisis in 1997 significantly impacted Hawaii's visitor industry. These events emphasized the dependency of the local economy upon the visitor industry and its vulnerability to external influences. While the tourist industry is expected to continue growing, it has matured to a point where healthy growth will demand a reinvestment in the infrastructure supporting the visitor industry. The County must continue to preserve, protect and enhance the unique qualities of the Big Island and promote the island as a vacation and business destination to respond to growing competition from tourist destinations around the world.

In 1970, just prior to the initial adoption of the General Plan, the population in the County of Hawaii numbered 63,468. The 1970 census count was the first to show an increase, albeit small, since 1930 when the population peaked at 73,325, largely as a result of the importation of labor for the sugar industry. The population decline between 1930 and the 1960s was primarily due to the increasing mechanization of the sugar plantation, limited job opportunities in other economic sectors, and the out-migration of residents. This decline was reversed during the 1960s with a modest growth of 2,140 residents between the 1960 and 1970 census.

Since 1970, the County's population has continued to grow. The 1980 census registered an island-wide resident population of 92,053 people representing a growth of

§1.5: County Profile

28,585 residents or a 45 per cent increase over the 1970 census. The 1990 census revealed a resident population of 120,317 residents, or an increase of 31 per cent over the 1980 resident population. The census registered 148,677 residents in 2000, a 24 per cent increase over the 1990 resident population. The County anticipates that its resident population will grow at an annual rate of 1.95 per cent to 2005, 2.04 per cent between 2005 to 2010, and 2.1 per cent between 2010 and 2020. Projected estimates for 2020 indicate an island resident population of 217,718, or an increase of 46 per cent over the estimated 2000 population of 148,677.

Table 2 summarizes the growth in Hawaii County's job count, by industry, from 1970 to 1997. Since 1980, employment trends within the County have appeared to shift from the non-service industry to the service industry in jobs such as wholesale and retail trade, finance, hotels, etc. In 1980, the service industries accounted for approximately 61 per cent of the private industry workforce and 49 per cent of the total wages earned. By 1997, the service industries have dominated the private industry, accounting for 79 per cent of the workforce and 74 per cent of the total wages earned. This growth in the service industry is mainly attributable to the growth in the County's tourism sector.

Employment within the County in 1980 totaled 40,850 on a population base of 92,053 residents. In 1990, employment increased to 55,200 on a population base of 120,317, representing a 3.05 per cent and 2.71 per cent annual compounded increase, respectively. The 2000 census showed a population of 148,677 and an employment base of 69,937. For the year 2020, the Planning Department anticipates a population of 217,718 with an employment base of 106,492. Average annual employment growth rates are anticipated at 2.05 per cent between 1999 and 2005, 2.11 per cent between 2005 and 2010, and 2.16 per cent between 2010 and 2020. These employment projections are below the robust 3.05 per cent average annual employment growth rates during the 1980s, but above the 1.61 per cent average annual growth rate during the 1990s.

Unemployment rates for the County of Hawaii dropped drastically from 1980 (6.2 per cent) to 1990 (3.8 per cent) due to the strong economy during this period. As the County entered the economic downturn that extended throughout the 1990s, its unemployment rate increased to 10.2 per cent by 1997. Per capita income during these same periods also saw a corresponding strong increase during the 1980s and a decline in growth during the 1990s.

§1.5: County Profile

Table 1-1. Population, Hawaii County, 1930-2000, Change From Previous Census

| Year | Population | Change in Population | Percentage |
|------|------------|----------------------|------------|
| 1930 | 73,325 | N/A | N/A |
| 1940 | 73,276 | - 49 | - 0.1% |
| 1950 | 68,350 | -4,916 | - 6.7% |
| 1960 | 61,332 | -7,018 | -10.3% |
| 1970 | 63,468 | 2,136 | 3.5% |
| 1980 | 92,053 | 28,585 | 45.0% |
| 1990 | 120,317 | 28,264 | 30.7% |
| 2000 | 148,677* | 28,360* | 23.6% |

* U.S. Census, 2000

Table 1-2. Job Count By Industry, 1970-1997

| Industry | 1970 | % of Total | 1984 | % of Total | 1997 | % of Total | % Change 1970 - 1997 |
|---|-------|------------|-------|------------|--------|------------|----------------------|
| Contract Construction | 1,670 | 5.72% | 1,150 | 2.72% | 3,810 | 7.33% | 128.14% |
| Manufacturing | 2,990 | 10.24% | 2,800 | 6.62% | 1,920 | 3.70% | - 35.79% |
| Durable Goods | 120 | 0.41% | 100 | 0.24% | 210 | 0.40% | 75.00% |
| Non-durable goods | 2,870 | 9.83% | 2,700 | 6.38% | 390 | 0.75% | - 86.41% |
| Food Processing | 2,350 | 8.05% | 2,350 | 5.56% | 1,320 | 2.54% | - 43.83% |
| Transportation, Commercial, and Utilities | 1,400 | 4.80% | 1,950 | 4.61% | 3,260 | 6.28% | 132.86% |
| Trade | 5,110 | 17.51% | 8,250 | 19.50% | 14,810 | 28.51% | 189.82% |
| Wholesale | 1,260 | 4.32% | 1,450 | 3.43% | 2,370 | 4.56% | 88.10% |
| Retail | 3,850 | 13.19% | 6,800 | 16.08% | 12,440 | 23.95% | 223.12% |
| Finance, Ins. & Real Est. | 890 | 3.05% | 1,350 | 3.19% | 2,740 | 5.27% | 207.87% |
| Services & Miscellaneous | 3,760 | 12.88% | 8,100 | 19.15% | 16,090 | 30.97% | 327.93% |
| Hotels | 1,750 | 6.00% | 3,800 | 8.98% | 6,980 | 13.44% | 298.86% |
| Other Services & Misc. | 2,010 | 6.89% | 4,300 | 10.17% | 9,110 | 17.54% | 353.23% |
| Government | 4,370 | 14.97% | 6,700 | 15.84% | 9,440 | 18.17% | 116.02% |
| Federal | 360 | 1.23% | 600 | 1.42% | 650 | 1.25% | 80.56% |
| State | 2,950 | 10.11% | 4,350 | 10.28% | 6,530 | 12.57% | 121.36% |
| Local | 1,060 | 3.63% | 1,750 | 4.14% | 2,260 | 4.35% | 113.21% |
| Agriculture | 5,830 | 19.97% | 6,200 | 14.66% | 4,950 | 9.53% | - 15.09% |
| Sugar | 1,900 | 6.51% | 1,350 | 3.19% | 0 | 0.00% | -100.00% |
| Self-Employed | 2,280 | 7.81% | 2,400 | 5.67% | 1,800 | 3.46% | - 21.05% |
| Other | 1,700 | 5.82% | 2,400 | 5.67% | 3,150 | 6.06% | 85.29% |

Table 1-2. Job Count By Industry, 1970-1997 (Continued)

| Industry | 1970 | % of Total | 1984 | % of Total | 1997 | % of Total | % Change 1970 - 1997 |
|---------------------------|--------|------------|--------|------------|--------|------------|----------------------|
| Total Non-Ag. Wage & Sal. | 20,190 | 69.17% | 33,200 | 78.49% | 49,450 | 95.19% | 144.92% |
| Total Non-Ag. Self Emp. | 3,170 | 10.86% | 2,900 | 6.86% | N/A | N/A | N/A |
| Total Self-Employed | 4,360 | 14.94% | 5,300 | 12.53% | N/A | N/A | N/A |
| TOTAL JOBS | 29,190 | | 42,300 | | 51,950 | | 77.97% |

County of Hawaii Data Book, 1998; State Department of Agriculture Statistics, 1997; N/A – not available

1.6 STATEMENT OF ASSUMPTIONS

The following assumptions were the basis by which the General Plan was developed:

- **Agriculture**

Since the mid-1980s, the County of Hawaii has seen a dramatic shift in its agricultural employment profile. The sugar industry was the island's most significant economic contributor from the mid-1800s to its peak production year of 1983. Since 1983, the sugar industry steadily declined until its ultimate demise in 1997 with the closure of the last sugar operation in Ka'u. The island of Hawaii has since established itself as the center of diversified agriculture production, research, and education in the State. Hawaii's new agriculture industry is characterized by a few large operations such as agroforestry and ranching along with many smaller family-owned farms that produce a multitude of high quality fresh and processed products for local and export markets. Agricultural employment will increase significantly as former sugarcane lands are brought into production with import replacement, export and value added crops and products. Additional employment will be derived from expanding agrotourism enterprises. The expansion of the industry will be facilitated by the establishment of a new air cargo distribution center and post-harvest processing facilities that will allow for significant increases in the volume and types of products exported to the continental United States and foreign countries. Agricultural research and education will be greatly enhanced.

- **Tourism**

The County will continue to pursue the development of a strong multi-market base for the visitor industry that includes direct oversea flights to Kona, growth of the cruise ship industry, strong resort-based employment centers and integrated product development for local products that can generate a healthy small business economic base. The County's visitor industry will continue to successfully grow and expand. Likewise, employment in the visitor industry and its related industries will continue to grow.

- **Other Basic Industries**

§1.7: Employment And Population Projections

There is tremendous potential for expansion in other industries such as aquaculture, astronomy, renewable energy, research and development, and special events such as cultural festivals and athletic events.

1.7 EMPLOYMENT AND POPULATION PROJECTIONS

The County's General Plan is a policy document that sets forth the direction for future activities on the island of Hawaii for the next few decades. In order to plan for the future, it is necessary to understand both historical and future trends related to the number of residents and visitors to be served and the kinds of facilities and resources needed to fulfill their needs.

In traditional public planning efforts, entire plans have been based on the achievement of the projected levels of population. In many of these cases, where population numbers are goals, plans become obsolete when the projected number of residents is not achieved or is surpassed. Thus, the population projections presented within the General Plan are not intended to be used as goals. Rather, this General Plan effort uses the projected levels of population as a guideline in land use planning. The projections represent what could reasonably be expected to occur in the future. The goals, policies, standards, and recommendations of this plan are intended to be flexible enough to accommodate population levels below or above the projections stated in this section.

Employment and population projections for the County of Hawaii were developed through the analysis of relationships between economic activity, employment, and population. The analytical approach used entails the forecasting of employment in basic industries and the relationship that changes in employment have upon population.

Primary Income Generators are those industries that generate income from outside the County. They are assumed to be the foundation of the local economy and the key to the development of the island. Primary Income Generators include agriculture, tourism, the manufacturing of export products, and research and development. These Primary Income Generators, in turn, "drive" the secondary industries, or those enterprises that service the Primary Income Generators or the local population and includes wholesaling, retailing and services. The Primary Income Generators determine the long-run pattern of population and income growth for the County.

Three sets of projections were developed for the comprehensive review program, Series A, B, and C. The major variables in each of these projections were the rate of growth of the visitor industry, the construction of the proposed State prison, the expansion of the University of Hawaii at Hilo, and the utilization of a post-harvest treatment facility for export agricultural products. It should be emphasized that the projections are not statements of goals. The population projections, and the strength of the correlation between primary economic generators and population growth, must be viewed with caution. The 1989 General Plan contained a similar set of economic and popula-

§1.7.1: Series A

tion projections. Visitor arrivals from 1990-2000, a primary economic generator, grew far less than projected. The 1989 “Series A” projected a 35 per cent growth in westbound visitor arrivals in the 1990-2000 period; the actual number barely increased. Agriculture, the other major primary economic sector, lost jobs because of the loss of the sugar industry. During the same time period, the county’s population grew about 24 per cent, just slightly less than the 1989 Series A projection of 27 per cent. It appears that there has been substantial population growth not driven by economic opportunities in the primary industries. This may be due to in-migration of people seeking other amenities such as a clean environment and rural lifestyle.

1.7.1 Series A

Series A is the most conservative projection. It assumes a 1 per cent annual growth rate in the visitor industry. It also assumes that the proposed State prison will not be constructed, job growth at the University of Hawaii at Hilo will be limited to 16 positions per year, and the papaya industry will grow at an annual rate of 1 per cent. Without the construction of the proposed State prison on the island, 2,000 construction jobs over three years and approximately 1,000 permanent jobs to run the facility will not be realized.

Table 1-3. Series A, Population and Visitor Industry Projections, Hawaii County, 1985-2020

| | Resident Population | Total Visitors to County | Hotel Room Inventory |
|------|---------------------|--------------------------|----------------------|
| 1985 | 105,900 | 760,000 | 7,511 |
| 1990 | 120,317 | 1,171,000 | 8,952 |
| 1995 | 137,290 | 1,084,000 | 9,575 |
| 2000 | 148,677 | 1,231,700 | 10,041 |
| 2005 | 159,397 | 1,283,700 | 10,503 |
| 2010 | 175,388 | 1,364,600 | 10,877 |
| 2015 | 193,118 | 1,434,200 | 11,177 |
| 2020 | 213,452 | 1,507,400 | 11,421 |

Economic Assessment, PKF Hawaii, January 2000
U.S. Census, 2000

§1.7.2: Series B

Table 1-4. Series A, Employment Projections, Hawaii County, 1985-2020

| Year | PRIMARY SECTORS | | | New Industries | Total Primary | Total Secondary | Total Jobs |
|------|-----------------|-------------|-------------|----------------|---------------|-----------------|------------|
| | Hotel Services | Agriculture | Manufacture | | | | |
| 1985 | 3,950 | 5,650 | 2,800 | 0 | 12,400 | 30,000 | 42,400 |
| 1990 | 6,250 | 5,700 | 2,300 | 0 | 14,250 | 42,736 | 56,986 |
| 1995 | 5,550 | 4,850 | 1,750 | 0 | 12,150 | 39,800 | 51,950 |
| 2000 | 6,620 | 5,103 | 1,650 | 356 | 13,729 | 56,154 | 69,883 |
| 2005 | 6,936 | 5,358 | 1,650 | 517 | 14,461 | 62,349 | 76,810 |
| 2010 | 7,295 | 5,665 | 1,650 | 690 | 15,300 | 69,338 | 84,638 |
| 2015 | 7,636 | 6,135 | 1,650 | 774 | 16,195 | 77,089 | 93,284 |
| 2020 | 7,969 | 6,969 | 1,650 | 870 | 17,458 | 85,992 | 103,450 |

Economic Assessment, PKF Hawaii, January 2000

1.7.2 Series B

Series B projections were developed as a medium series. These projections represent a moderate growth rate between Series A and C. The overall per annum employment growth rate anticipated in Series B ranges between 2 per cent and 2.2 per cent. It also assumes a modest 2 per cent annual growth rate for visitor arrivals, compared to a historical growth rate of 1.45 per cent between the years 1977 and 1998. This projection also assumes that an additional 70 new positions will be created at the University of Hawaii at Hilo to accommodate the additional 1,000 students expected to be enrolled within the next ten years. Finally, the establishment of the Hilo Call Center will ultimately create an additional 300 new jobs.

Table 1-5. Series B, Population and Visitor Industry Projections, Hawaii County, 1985-2020

| | Resident Population | Total Visitors to County | Hotel Room Inventory |
|------|---------------------|--------------------------|----------------------|
| 1985 | 105,900 | 760,000 | 7,511 |
| 1990 | 120,317 | 1,171,000 | 8,952 |
| 1995 | 137,290 | 1,084,000 | 9,575 |
| 2000 | 148,677 | 1,265,700 | 10,041 |
| 2005 | 159,908 | 1,401,800 | 10,513 |
| 2010 | 176,937 | 1,551,100 | 10,892 |
| 2015 | 195,965 | 1,712,500 | 11,200 |
| 2020 | 217,718 | 1,890,700 | 11,452 |

Economic Assessment, PKF Hawaii, January 2000
U.S. Census, 2000

Table 1-6. Series B, Employment Projections, Hawaii County, 1985-2020

| Year | PRIMARY SECTORS | | | New Industries | Total Primary | Total Secondary | Total Jobs |
|------|-----------------|-------------|-------------|----------------|---------------|-----------------|------------|
| | Hotel Services | Agriculture | Manufacture | | | | |
| 1985 | 3,950 | 5,650 | 2,800 | 0 | 12,400 | 30,000 | 42,400 |
| 1990 | 6,250 | 5,700 | 2,300 | 0 | 14,250 | 42,736 | 56,986 |
| 1995 | 5,550 | 4,850 | 1,750 | 0 | 12,150 | 39,800 | 51,950 |
| 2000 | 6,642 | 5,103 | 1,650 | 356 | 13,751 | 56,186 | 69,937 |
| 2005 | 7,014 | 5,358 | 1,650 | 607 | 14,629 | 62,797 | 77,426 |
| 2010 | 7,417 | 5,665 | 1,650 | 870 | 15,602 | 70,359 | 85,961 |
| 2015 | 7,819 | 6,135 | 1,650 | 954 | 16,558 | 78,865 | 95,423 |
| 2020 | 8,221 | 6,969 | 1,650 | 1,050 | 17,890 | 88,602 | 106,492 |

Economic Assessment, PKF Hawaii, January 2000

1.7.3 Series C

Series C projects a more rapid growth. It assumes that visitor growth rates are in the 3 per cent-plus range as compared to the Series B assumption of a 2 per cent growth rate. The construction of the proposed State prison will generate 2,000 construction jobs over three years and 1,000 permanent jobs to support the facility. This projection also assumes that the papaya industry will grow at 4 per cent, rather than 2 per cent, because of the utilization of a post-harvest treatment facility.

Table 1-7. Series C, Population and Visitor Industry Projections, County of Hawaii, 1985-2020

| | Resident Population | Total Visitors to County | Hotel Room Inventory |
|------|---------------------|--------------------------|----------------------|
| 1985 | 105,900 | 760,000 | 7,511 |
| 1990 | 120,317 | 1,171,000 | 8,952 |
| 1995 | 137,290 | 1,084,000 | 9,575 |
| 2000 | 148,677 | 1,278,700 | 10,041 |
| 2005 | 166,576 | 1,489,900 | 10,519 |
| 2010 | 188,031 | 1,729,200 | 10,906 |
| 2015 | 211,357 | 2,004,600 | 11,223 |
| 2020 | 237,323 | 2,323,900 | 11,487 |

Economic Assessment, PKF Hawaii, January 2000
U.S. Census, 2000

Table 1-8. Series C, Employment Projections, Hawaii County, 1985-2020

| Year | PRIMARY SECTORS | | | New Industries | Total Primary | Total Secondary | Total Jobs |
|------|-----------------|-------------|-------------|----------------|---------------|-----------------|------------|
| | Hotel Services | Agriculture | Manufacture | | | | |
| 1985 | 3,950 | 5,650 | 2,800 | 0 | 12,400 | 30,000 | 42,400 |
| 1990 | 6,250 | 5,700 | 2,300 | 0 | 14,250 | 42,736 | 56,986 |
| 1995 | 5,550 | 4,850 | 1,750 | 0 | 12,150 | 39,800 | 51,950 |
| 2000 | 6,651 | 5,126 | 1,650 | 356 | 13,783 | 56,205 | 69,988 |
| 2005 | 7,071 | 5,420 | 1,650 | 1,607 | 15,748 | 65,784 | 81,532 |
| 2010 | 7,534 | 5,797 | 1,650 | 1,870 | 16,851 | 75,466 | 92,317 |
| 2015 | 8,010 | 6,280 | 1,650 | 1,954 | 17,894 | 86,087 | 103,981 |
| 2020 | 8,506 | 7,146 | 1,650 | 2,050 | 19,352 | 97,954 | 117,306 |

Economic Assessment, PKF Hawaii, January 2000

Economic activity within the County is anticipated to grow at a moderate rate with a continuing, although declining, dependency upon the tourism industry. In 2000, approximately 9.3 per cent of the County's employees were employed by hotels. By 2020, hotel workers may account for employment in the total workforce ranging from 7.7 per cent in Series A to 7.3 per cent in Series C.

1.8 POPULATION DISTRIBUTION

From the estimates of the islandwide resident population, other estimates have been made to project the distribution of population over the districts of the island. These are not intended to be included as population achievement levels for the districts, nor as firm statements or descriptions of future conditions. They are based on assumptions of potential employment growth rates described in the previous islandwide employment and population estimates, past district growth trends, and trends in the distribution of population on the island.

Table 1-9. District Resident Population Distribution, Year 2020

| | A | B | C |
|-----------|----------|----------|----------|
| Puna | 57,105 | 58,246 | 63,491 |
| S. Hilo | 48,815 | 49,791 | 54,274 |
| N. Hilo | 1,842 | 1,879 | 2,048 |
| Hamakua | 7,184 | 7,328 | 7,988 |
| N. Kohala | 11,053 | 11,273 | 12,289 |
| S. Kohala | 23,947 | 24,426 | 26,625 |
| N. Kona | 41,447 | 42,275 | 46,082 |
| S. Kona | 13,816 | 14,092 | 15,361 |
| Ka'u | 8,243 | 8,408 | 9,165 |
| Total | 213,452 | 217,718 | 237,323 |

Economic Assessment, PKF Hawaii, January 2000

§1.8: Population Distribution



ECONOMIC

2.1 INTRODUCTION AND ANALYSIS

The development of sound public policy requires an understanding of the economic factors affecting the planning area or region. Such factors are largely responsible for growth or lack of growth, and any planning effort which does not take them into account cannot be very effective. In varying degrees the other elements of the planning process are affected by the local economy.

Population usually settles, expands or declines within a given area in some correlation to economic opportunities or the lack of them. Besides affecting the number and density of population, economic activity has a direct bearing on income level, which to a certain extent determines the standard of living of the individual.

Different types of employment influence the social character of communities. The size and character of a community will define its need for housing, transportation, public utilities and facilities, special combinations of land use, recreation, and other forms of public and social services and facilities. Economic studies are thus one of the necessary first steps in developing plans for public and private actions.

Government has responsibility to identify, understand, forecast, protect and promote local economic sectors and to balance economic growth with desired environmental, social and other objectives of the community. Government has many policy instruments available to influence and guide developments, investment, and operation of private and public interests.

The economy, however, should not be considered as the primary focus of the General Plan. The planning process is geared towards the achievement of a higher quality of life for the residents of the County. Working towards the goals, policies, and standards of the economic element are only one aspect of accomplishing this desired end.

The island offers several amenities conducive for economic growth. Many of these are natural amenities such as a favorable and equitable climate, scenic vistas, high mountains, deep ocean, active volcanoes, large land areas, and an environment generally free of pollution.

Despite these amenities, there have been a number of problems that have limited the growth of the island. Most imported goods must be transshipped through Honolulu. The

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distances from the population centers of Honolulu, the mainland, and other major markets have limited the growth of export products from the Big Island. Products that are unique and/or have high value (such as macadamia nuts, flowers and nursery products, coffee, and papaya) have been successfully exported.

As the County's population and its tourism industry grow larger and the export volume increases, more favorable rates on overseas carriers may be instituted.

The relatively small population in the State, coupled with the distance to mainland markets, creates a disadvantage for local businessmen. The size of the State's population does not allow for efficient operations, and when exportation is considered in order to expand a particular market, the entrepreneur is faced with high transportation costs.

Natural disasters, such as tsunamis, volcanic activity, flooding, and droughts, are events that have and continue to shape the economic development on this island. For example, while volcanic activity has destroyed homes and historic features, it is also the County's largest single tourist attraction. In addition to actual physical damage, the fear of the recurrence of natural hazards presents a psychological barrier for investment. Measures to protect life and property have been planned and instituted throughout the County. Further hazard mitigation measures are reported in this plan.

The economy of the County has experienced significant changes over the past three decades since the adoption of the County's first comprehensive General Plan in 1971. Sugar cultivation was the leading agricultural activity during the 1970s and early 1980s. The latter half of the 1980s and throughout the 1990s saw the decline and eventual demise of the sugar industry on this island. Tourism replaced sugar as the County's primary economic generator during the mid-1980s and saw its peak visitor arrival numbers in 1989. Since 1990, external factors such as the Asian economic crisis, the Persian Gulf War, and a brief economic downturn in the U.S. Mainland have contributed toward the State continuing in a protracted economic doldrum. Nevertheless, the County was still successful in attracting several world-class events and saw the completion of several major projects including the opening of the 351-room Hapuna Beach Prince Hotel and the 243-room Hualalai Resort, the start of direct national and international flights to Kona, the filming of the movie *Waterworld*, and the arrival of the PGA Seniors MasterCard Tournament of Champions at the Hualalai Resort and Golf Course.

Agriculture

Agriculture currently constitutes a major economic sector of the island of Hawaii. Including processing, the agricultural industry accounts for about 9.5 per cent of the island's employment. Local agricultural pursuits include the raising of cattle and other

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livestock, the growing of coffee, macadamia nuts, papaya, flowers and nursery products, vegetables, aquaculture, forestry and several processing plants that utilize locally grown products.

Some large corporate agricultural ventures such as macadamia nut plantations, operate on the island. However, diversification of the industry has led to smaller operations producing an ever increasing array of fresh vegetables, fruits, forestry, and aquaculture products.

Hawaii County accounts for approximately one-third of the fresh vegetables produced in the State of Hawaii, over half of the beef consumed, one-third of the coffee grown, most of the macadamia nuts, and varying percentages of the other crops and livestock. The total value of agricultural marketing declined approximately 20 per cent between 1985 and 1997. The number of farms and livestock operations during this same period increased from 2,650 to 3,319 operations. Acreage in farms, however, declined 57 per cent between 1985 and 1997. Agriculture has shown substantial growth on the island. The island accounted for 55 per cent of the crops in the State in 1997 while livestock on the island accounted for 18 per cent of the State total. While the County's share of statewide agriculture production has remained relatively constant, its livestock production has been steadily declining since peaking in the late 1980s. Much of this decline can be attributed to the closing of all feedlots within the State by 1993 due to the high cost of importing feed. Approximately 90 per cent of all beef cattle are now exported to mainland feedlots to be "grain-finished" before slaughter. New ventures in forestry and aquaculture have expanded opportunities and show promise for the future.

One of the most pressing problems faced by today's agricultural industries is their ability to attract labor. Agriculture is facing increasing competition for labor from other sectors of the economy, such as the visitor, retail and construction industries. There is also a demand for a greater number of personnel with technical and professional agricultural training. A related problem is the housing shortage for both minimum wage and seasonal labor.

Competition from urban uses for agricultural lands has intensified. The protection of important agricultural lands, however, has long been a policy of the County.

The relatively small population of the State and its isolation from overseas markets are limiting factors for the production of agricultural products for local consumption and export. The State Department of Agriculture, the Department of Business, Economic Development and Tourism, the University of Hawaii - College of Tropical Agriculture, and the County have programs to assist the industry.

The opportunities for the expansion of agriculture on the Big Island seem to be immense. The demand for fresh, locally grown products continues to grow as restaurants,

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grocery stores and hotels seek the highest quality products for their guests. Export products grown mostly on the Big Island, such as coffee, papaya, macadamia nuts, and flowers, also continue to expand. These commodities and others, such as ginger, guava and other tropical fruits, have potential for growth. There are also new high value crops which have the potential to be successfully cultivated. One such high value crop is Kava (Awa), a medicinal plant which has the potential to be a viable cash crop. Locally, small growers as well as a few large growers are producing Kava. Vanilla bean, cacao, nutraceuticals, hard wood forestry products, and medicinal plants are other types of high value crops that hold much promise for growth.

The expansion of the agriculture industry can also be measured by the success of overcoming some of the restrictive governmental regulations that prevent many locally grown products from being exported to domestic or foreign markets. Concerns regarding the transmission of plant pests and diseases during export have or could be adequately addressed by current treatment or processing technologies. The development of new protocol and processing facilities for quarantine treatment will assure the further expansion of the agricultural industry.

In order for Hawaii's cattle industry to strengthen, new techniques need to be developed for raising forage-finished cattle to compete in the marketplace with grain-finished cattle. Hawaii cattle will then be able to finish grazing on island pastures and remain for consumption within local markets. Local producers also need to find new venues such as processed meats and pre-fabricated meals to market locally raised cattle. By creating a market niche for forage-finished beef, ranchers will be able to keep cattle in Hawaii, increasing production weights and revenues for the State economy.

Forestry

As one of the most heavily traded commodities on the global market and the tenth largest industry sector in the world, forest products grown in Hawaii may be able to capitalize on its central Pacific location, excellent growing climate, and the availability of vast expanses of former sugar lands. Hawaii's growth rates for forest products are among the fastest in the world. As a result, at least 24,000 acres are now being cultivated for eucalyptus production, with thousands of additional acres being planned. Dozens of landowners within the County are currently involved with the commercial production of forest products, both eucalyptus and higher value hardwoods such as toon, maple, and koa. A 1981 State Division of Forestry and Wildlife study identified approximately 80,000 acres of former sugarcane land as ideal for the establishment of a forest plantation. An additional 100,000 acres of pasture and brush lands were identified for longer-rotation forest plantations. The study concluded that there are ample lands available on the island to establish a forest plantation industry.

Fishing and Aquaculture

Fishing and aquacultural activities are also basic economic sectors. The commercial fishing industry on the island accounted for \$6,100,000 in 1997 and remains the second largest commercial fishing producer in the State. The County's commercial fishing industry has shown a stable catch and poundage sold during the past five years ending in 1998. This stability in the local fishing industry is expected to continue for the foreseeable future.

The deep cold coastal waters off Keahole Point are nutrient rich and pathogen free. The Natural Energy Laboratory of Hawaii Authority (NELHA) is a State-funded facility located on 870 acres of land at Keahole, North Kona. The facility provides support for various research, commercial and educational programs that seek to locate at the Natural Energy Laboratory of Hawaii Authority project site to take advantage of its unique resources, including its cold, nutrient-rich ocean waters and high solar insolation. Microalgae, lobsters, abalone, ornamental fish and other sea vegetables and animals are grown at Natural Energy Laboratory of Hawaii Authority.

The Pacific Aquaculture and Coastal Resource Center is a joint effort by the University of Hawaii at Hilo, the County, State and the Keaukaha Hawaiian Homelands Community Association to establish a research and training facility in Hilo for local aquaculture farmers and university students. The center has the capacity to create water of any salinity or temperature necessary to raise fish. Operation of this center is expected to generate approximately \$650,000 annually to the local economy. Value added benefits are expected to add another \$3,000,000.

Aquaculture operations County-wide have grown from eight operations in 1982 to forty-three in 1996. During this same period, annual revenues have grown from \$90,600 to \$13,200,000. The County accounts for 37 per cent of the total aquaculture operations within the State but accounts for over 80 per cent of the total production and over 84 per cent of the production value. While most of the production from aquaculture farms is now sold locally, there are large markets overseas that these producers would like to tap. To assist the export of products overseas, the State has an Aquaculture Development Program (ADP). This organization provides a variety of support services to the aquaculture industry, such as information dissemination, business counseling, marketing, animal health management, and research and development funding. The key to the future growth and success of the aquaculture industry in the County is the ability of Natural Energy Laboratory of Hawaii Authority to obtain funding to increase the flow of deep sea water to its facilities and tenants and the expansion of its support facilities. These improvements will encourage longer residency at the facility by its current tenants as well as attract additional projects.

The Federal government has shown its support of Hawaii's aquaculture industry by approving \$9,000,000 for Hawaii aquaculture initiative in July 1997, of which

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\$1,600,000 has been appropriated for Tropical Aquaculture Research. In addition, the venture capital partnership HMS Hawaii Management Partners announced in December 1998 their commitment to contribute up to \$10,000,000 to help island entrepreneurs finance their aquaculture operations.

Manufacturing

Congress recently funded construction and committed to staffing the USDA's ARS (Agricultural Resource Services) Pacific Basin Agricultural Resource Center in Hilo. The purpose of the facility is to improve the well-being of Hawaii and the Pacific Basin by strengthening the agricultural sectors, fortifying small farm profitability and sustainability by increasing efficiency of farming practices, identification of preservation and improvement of germplasm adapted to island environments, the development of pest controls and post-harvest technology, and increasing the value of products through the development of value added processing.

Other manufacturing activities are service-oriented, such as bakeries, printing and iron works. These operations are usually located close to population centers or transportation facilities.

Visitor Industry

Tourism became the primary economic generator in the County during the 1980s. From 1982 to 1990, visitor arrivals grew at an average annual rate of 5.66 per cent. Visitor arrivals started to decline in 1991 due to recessions in the United States and Japan and the advent of the Persian Gulf War. These external events impacted visitor arrivals until 1996, when direct flights from Japan to Kona International Airport at Keahole were initiated. In the eight years ending in 1998, the annual visitor arrival growth rate was 1.18 per cent, much less than the previous eight years.

The growth of Hawaii County in terms of employment, population, income and economic activity during recent years has been more closely tied to the visitor industry than any other sector of the economy. Employment opportunities spurred by the growth of this industry has been the catalyst for economic growth in the County. As tourism became the primary economic generator during the 1980s, a shift in employment from the non-service to the service industry sector was evident. In 1980, the service industry accounted for approximately 60.6 per cent of average employment, rising to 71.3 per cent in 1990 and 78.5 per cent in 1997. The County experienced the largest growth in hotel job count statewide with an average annual growth rate of 5.2 per cent between 1981 and 1997.

The principal visitor destination area of the Big Island is the South Kohala-North Kona region in West Hawaii. The single most popular attraction is Hawaii Volcanoes National Park.

The island continues to attract substantial investor interest in the visitor industry. Various resort and resort-residential complexes are currently under construction or are planned for construction in the near future. Most of these developments are concentrated in West Hawaii in the Kohala and Kona Districts, which will continue to accommodate the majority of the visitor market within the County. Visitor accommodation units within the County totaled 9,655 units in 1998, up from 8,952 units in 1990. Bed and breakfast units, although not a significant part of the total visitor unit count, have been the fastest growing segment of the industry, growing from 55 units in 1990 to 171 units in 1998. Historically, the County records the lowest visitor unit occupancy rates of all the major Hawaiian islands. Only in 1998 did the County's occupancy rate finally surpass that of Kauai.

Continued investor interest in resort and resort-residential development in the County suggests an economic future that promises new jobs and more commercial, recreational, and cultural activities. Along with these promises of a "better" life is the realization that the visitor industry is sensitive to exogenous factors, such as the national economy. High quality development, however, seems less subject to these factors. The key to orderly growth lies in proper planning and controlled development.

The cruise ship industry is a potential growth area for the County. In recent years, the total number of visitors to the County from cruise ships has increased substantially from 124,000 in 1997 to 184,000 in 1998. Based on 1998 visitor counts, cruise ship visitor annual expenditures are estimated to range from \$16,000,000 to \$23,000,000. Cruise ship visitors are expected to continue to increase in the future due to the recent resurgence and popularity of this industry along with the projected construction of additional cruise ships.

The County's natural beauty, historical and cultural attributes and its numerous educational institutions and programs lend themselves to provide the catalyst to allow new niche markets to flourish. Niche markets for the County's visitor industry, such as ecotourism, health and wellness tourism and educational tourism, have growth potential. The health and fitness resources of the various luxury hotels look towards health and wellness tourism as one of its target markets. The expansion of tourism should include careful planning to identify, promote and preserve the island's unique resources.

Research and Development

Hawaii County has participated in the research and development industry through the Mauna Kea and Mauna Loa Observatories, the University of Hawaii Cloud Physics Laboratory, Hawaii Volcano Observatory, and various agricultural research centers. The University of Hawaii at Hilo has and will play an increasingly important role in this community. The university complex itself is an important economic force. The University of Hawaii at Hilo's Long Range Development Plan (1996) envisions a tar-

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get enrollment of 5,000 full-time equivalent (FTE) students by 2025, or roughly twice the 1995 enrollment. The plan outlines the program and facilities requirements necessary to accommodate the projected growth in enrollment.

The Natural Energy Laboratory of Hawaii Authority (NELHA) at Keahole, North Kona is currently involved in research and development in energy, materials and aquacultural projects. Hawaii Ocean Science and Technology (HOST) park, an integral part of the Natural Energy Laboratory of Hawaii Authority, is located adjacent to NELHA and is being developed for similar projects on a commercial scale.

The County is also participating in the development of the Pacific Aquaculture and Coastal Resources Center at Keaukaha, South Hilo for research in the spawning activities of several fish species and providing a research and training facility for university students and local farmers. The USDA's PBARC facility will bring substantial research resources to Hawaii.

The summit area of Mauna Kea has the worldwide distinction as the best international center for observational astronomy. Mauna Kea currently accommodates twelve of the world's most state-of-the art telescope facilities. The newest telescope is the \$300,000,000 Subaru telescope developed by the National Astronomical Observatory of Japan. The recent completion of the University of Hawaii-Hilo Institute of Astronomy complex at University Park will support the relocation of the Institute of Astronomy staff from UH-Manoa to UH-Hilo. The UH-Hilo is also working to offer a Bachelor of Science degree in astronomy to allow observatories to hire local astronomers. Approximately \$619,000,000 of capital investments into the County have been made by the astronomy industry, including the creation of approximately 270 permanent jobs. Astronomical activities contribute approximately \$50,000,000 annually to the County's economy.

Military presence within the County is represented by the United States Army. The U.S. Army operates a field training facility at the Pohakuloa Training Area on Mauna Kea and a recreational camp at the Kilauea Military Camp-Joint Services Recreation Center located within the Hawaii Volcanoes National Park. Permanently stationed military units are not located on this island. The Department of Defense appropriated direct expenditures or obligations of \$37,800,000 within the County in 1997, an increase of 84.4 per cent over 1987 appropriations. However, the Federal government's downsizing and restructuring of the U.S. military may eventually lead to base closings. As a result, military activities may not be a major economic sector in the foreseeable future.

Secondary Industries

Secondary industries, such as government, construction, trades (retail and wholesale), utilities, financial institutions, and professional services are most often located close to population centers. Population usually locates close to employment centers that, in turn, are based on primary income generators, such as tourism or agriculture. Major transportation facilities also attract secondary industries.

Annual employment in the secondary industry between 1980 and 1990 increased a healthy 4.54 per cent. Latest census information from the State Department of Labor and Industrial Relations reveal that employment within the secondary industry between 1990 and 1997 increased by only 1.2 per cent annually, a dramatic slowdown in the growth of employment within the secondary industry due to the protracted growth of the local economy. The secondary economic sector employment accounted for 67.8 per cent of the County's workforce in 1997, compared to 69.7 per cent in 1990 and 60.5 per cent in 1980.

The largest secondary employment sector is the wholesale and retail trade, which reported the greatest percentage gain in average employment of 78.6 per cent between 1980 and 1990, but a mere 2.8 per cent between 1990 and 1997. The services sector has replaced the government as the second largest secondary economic sector in the County.

The major governmental, service, commercial, transportation, and educational center on the island of Hawaii is the city of Hilo. Of the island's population, approximately 30 percent reside within the city limits. Key to the growth of the city has been its transportation facilities. Until Kawaihae Harbor was constructed on the west coast of the island, Hilo Harbor was the only deepwater port in the County. The Hilo International Airport has been improved to accommodate larger aircraft while Kona International Airport at Keahole has been receiving direct national and international overseas flights.

The future economic outlook for the County is uncertain due to the state of foreign economies and its impact on tourism. Tourism is expected to continue as the primary economic generator in the near term. As a result, the services industry is expected to also be a dominant factor in the future of the County.

The County's vast quantity of natural resources and land will support the future growth of the County's non-service industries, especially agriculture. The willingness of the County and its residents to innovate and expand into new fields of industry will help the future expansion of the entire economy. As the primary sectors of the economy expand, the expansion of the secondary economic sectors will follow accordingly.

Enterprise Zones

The Hawaii Enterprise Zone (EZ) program is a partnership between State and County governments and the private sector to stimulate, via tax and other incentives, certain types of business activity, job preservation, and job creation in areas most appropriate or needed. To be eligible for EZ benefits, at least half of a firm's annual gross income must be derived from one or more of the following activities – agricultural production or processing, manufacturing, wholesale/distribution, aviation or maritime repair/maintenance, telecommunications switching and delivery systems, information technology design and production, medical research/clinical trials/telemedicine or for-profit training programs in international business management or environmental remediation. Within the County of Hawaii, businesses that satisfy all of the requirements will qualify for the following tax benefits for up to seven consecutive years: 1) 100 per cent exemption from the General Excise Tax (GET) and Use Tax every year (contractors are also exempt from the GET on construction done within an EZ for an EZ-enrolled business); 2) an 80 per cent reduction in State income tax the first year (this reduction goes down 10 per cent each year for six more years); 3) an additional State income tax reduction equal to 80 per cent of annual Unemployment Insurance premiums the first year (this reduction goes down 10 per cent each year for six more years); and 4) a three-year exemption from any increase in County property taxes resulting from new construction in an EZ by EZ-enrolled businesses.

Within the County of Hawaii, Enterprise Zones have been established within portions of the Hilo, Hamakua, North Kohala, North Kona, South Kona and the Ka'u districts. In 1999, there were approximately 40 EZ-enrolled businesses located throughout the island.

Employment

Employment opportunities have increased by over 22,700 jobs from 1970 through 1997. The 1980s saw employment grow at an annual compounded growth rate of 3 per cent. From 1990 to 1997, employment grew at an annual compounded rate of only 1.61 per cent, a reflection of the County's recessionary economy during this period. Employment in secondary industries also expanded. The largest employment decrease was in the sugar industry which saw the closing of the island's last sugar processing facility in 1997.

Unemployment rates during the 1980s and 1990s followed a similar trend as employment. Unemployment rates dropped drastically from 1980 to 1990 (6.2 per cent to 3.8 per cent, respectively) due to the County's strong economy during this period. As the economy slowed during the 1990s, unemployment increased to 10.2 per cent by 1997. For 1997, the districts of Puna and Ka'u experienced the highest unemployment rates at 15.6 per cent and 14.8 per cent, respectively.

The following table depicts the shifting of employment between the major sectors of the County's economy. It indicates that the County's economy has shifted from an economy dominated by agriculture in 1960 to a more diversified economy with a significant service-oriented component.

Table 2-1. Employment by Major Economic Sector, 1960-1997

| | 1960 | 1970 | 1984 | 1997 |
|------------------------------------|-------|-------|-------|-------|
| Percent Employed in Hotels | 2.2% | 6.0% | 9.0% | 13.4% |
| Percent Employed in Other Services | 5.4% | 6.9% | 10.2% | 17.5% |
| Total Service Employment | 7.6% | 12.9% | 19.2% | 31.0% |
| Percent Employed in Agriculture | 27.0% | 20.0% | 14.7% | 9.5% |

Estimates - County of Hawaii Planning Department

Per capita income in the County grew at an annual compounded rate of 5.18 per cent during the 1980s and 2.91 per cent through 1996. The increase during the 1980s are reflective of the strong economic conditions that existed at the time with a corresponding decrease in per capita income growth during the recessionary periods of the 1990s. Median household income also increased at a healthy rate from 1980 to 1990, increasing from \$16,975 to \$29,712 at an annual compounded rate of 5.76 per cent. During this period, every district within the County also recorded increases in median family household income with the greatest increases occurring in the districts of South Kohala and North Kohala (8.43 per cent and 8.29 per cent, respectively).

According to statistics from the State Department of Labor and Industrial Relations, there has been a shift in employment trend from the non-service industry to a dominant service industry within the County. In 1980, service industries (wholesale/retail trade, finance, hotels, etc.) accounted for approximately 61 per cent of the private industry workforce and 49 per cent of the total wages earned. By 1997, the service industries dominated the private industry, accounting for approximately 79 per cent of the total workforce and 74 per cent of the total wages earned. This shift in employment trends has significantly changed the economic make-up of the County as workers have in-migrated to the Big Island to meet the demands of employment growth in the service industry, which is primarily fueled by the tourism sector. Additionally, non-service industry workers, primarily in agriculture, adjusted and shifted to new employment opportunities in the service industries as agricultural jobs dwindled.

Upon completing high school, an increasing proportion of the County's youth have pursued higher education. However, despite this trend, there is still scarcity of employment opportunities for the college-educated who desire to return to the island.

Population

The population of Hawaii County has grown steadily since 1980. According to the 2000 U.S. Census, the County’s population increased 23 per cent between 1990 and 2000. During the same period, the State’s population grew by 9 per cent. The district of Puna saw the largest increase at 51 per cent, followed by South Kohala (44 per cent), North Kohala (41 per cent), Ka'u (31 per cent), North Kona (28 per cent), South Kona (12 per cent), North Hilo (12 per cent), Hamakua (10 per cent) and South Hilo (6 per cent).

Utilizing Series B, the County’s population is projected to grow 46 per cent to 217,718 from 2000 to 2020. South Hilo, currently the most populous district within the County, will be eclipsed by the Puna District in 2020 with an estimated population of 58,246 compared to South Hilo’s 49,791.

Table 2-2. Projection of Resident Population by District, Year 2000 to 2020 (Series B)

| District | 2000 | 2005 | 2010 | 2015 | 2020 |
|--------------|---------|---------|---------|---------|---------|
| Total | 148,677 | 159,907 | 176,938 | 195,965 | 217,718 |
| Puna | 31,335 | 36,351 | 42,591 | 49,801 | 58,246 |
| South Hilo | 47,386 | 46,273 | 47,477 | 48,614 | 49,791 |
| North Hilo | 1,720 | 1,643 | 1,720 | 1,798 | 1,879 |
| Hamakua | 6,108 | 6,196 | 6,561 | 6,933 | 7,328 |
| North Kohala | 6,038 | 6,622 | 7,917 | 9,446 | 11,273 |
| South Kohala | 13,131 | 15,659 | 18,184 | 21,072 | 24,426 |
| North Kona | 28,543 | 30,467 | 34,024 | 37,922 | 42,275 |
| South Kona | 8,589 | 10,253 | 11,414 | 12,681 | 14,092 |
| Ka'u | 5,827 | 6,443 | 7,050 | 7,698 | 8,408 |

Economic Assessment, PKF Hawaii, January 2000
 U.S. Census, 2000
 Hawaii County Department of Research and Development

The Puna District will continue to experience relatively strong population growth due to the availability of relatively inexpensive lots that were created around the 1960s. The growth of the population in North and South Kohala, North Kona and South Kona are closely associated with the continuing growth of the visitor and agricultural industry within these districts.

2.2 GOALS

- (a) Provide residents with opportunities to improve their quality of life through economic development that enhances the County’s natural and social environments.

- (b) Economic development and improvement shall be in balance with the physical, social, and cultural environments of the island of Hawaii.
- (c) Strive for diversity and stability in the economic system.
- (d) Provide an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County's cultural, natural and social environment.
- (e) Strive for an economic climate that provides its residents an opportunity for choice of occupation.
- (f) Strive for diversification of the economy by strengthening existing industries and attracting new endeavors.
- (g) Strive for full employment.
- (h) Promote and develop the island of Hawaii into a unique scientific and cultural model, where economic gains are in balance with social and physical amenities. Development should be reviewed on the basis of total impact on the residents of the County, not only in terms of immediate short run economic benefits.

2.3 POLICIES

- (a) Assist in the expansion of the agricultural industry through the protection of important agricultural lands, development of marketing plans and programs, capital improvements and continued cooperation with appropriate State and Federal agencies.
- (b) Encourage the expansion of the research and development industry by working with and supporting the University of Hawaii at Hilo and West Hawaii, the Natural Energy Laboratory at Hawaii Authority and other agencies' programs that support sustainable economic development in the County of Hawaii.
- (c) Encourage the development of a visitor industry that is in harmony with the social, physical, and economic goals of the residents of the County.
- (d) Require a study of the significant cultural, social and physical impacts of large developments prior to approval.
- (e) Encourage the sustainable development of the fishing industry, various forms of aquaculture, and other fresh and sea water-based activities.
- (f) Support all levels of educational, employment and training opportunities and institutions.
- (g) Capital improvements program shall improve the quality of existing commercial and industrial areas.
- (h) The land, water, air, sea, and people shall be considered as essential resources for present and future generations and should be protected and enhanced through the use of economic incentives.

§2.3: Policies

- (i) Continue to encourage the research, development and implementation of advanced technologies and processes.
- (j) Support the development of high technology industries.
- (k) Continue to encourage development and utilization of by-products from alternate energy conversion projects.
- (l) Identify and encourage primary industries that are consistent with the social, physical, and economic goals of the residents of the County.
- (m) Encourage active liaison with the private sector with respect to the County's requirements for establishing businesses on the island.
- (n) Encourage the development of the retirement industry.
- (o) Promote a distinctive identity for the island of Hawaii to enable government, business and travel industries to promote the County of Hawaii as an entity unique within the State of Hawaii.
- (p) Identify the needs of the business community and take actions that are necessary to improve the business climate.
- (q) Support research and development that would lead to the removal of marketing restrictions on Hawaiian fruits and other perishables.
- (r) Assist in the development of a film and video industry program to market Big Island sites and coordinate film and video activities on the Big Island.
- (s) Assist the further development of agriculture through the protection of important agricultural lands.
- (t) Assist in the promotion of the agriculture industry whose products are recognized as being produced on the island of Hawaii.
- (u) Encourage the establishment of open farmers markets to allow local agricultural producers to market their products.
- (v) Assist in cooperative marketing and distribution endeavors to expand opportunities for local agricultural products for export as well as to the local market.
- (w) Encourage the further development of the overseas capacity of Hilo International Airport for the exportation of agricultural crops.
- (x) Encourage the health/wellness industry.
- (y) Encourage new industries that provide favorable benefit-cost relationships to the people of the County. Benefit-cost relationships include more than fiscal considerations.

2.4 DISTRICTS

The following is a brief analysis by judicial district for each district. The entire County, however, is an economic system with many interrelationships and interdependence among the various districts. Each district is an integral part of the County and is treated as such. The courses of action shall be consistent with and supportive of the goals, policies, and standards set forth in the overall economic element.

2.4.1 Puna

2.4.1.1 Profile

| Population | 1980 | 1990 | 2000 | 1980-90 % Change | 1990-00 % Change |
|------------|--------|--------|--------|---------------------|---------------------|
| Puna | 11,751 | 20,781 | 31,335 | 76.8 | 50.8 |

Economic Assessment, PKF Hawaii, January 2000
 U.S. Census, 2000
 Hawaii County Department of Research and Development

The population increased in Puna as a result of employment opportunities in agriculture as well as job opportunities in Hilo. Also contributing to this increase was an immigration into subdivided areas due to the affordability of parcels within Puna. The table above reflects the continuing population growth within the Puna District. The population in Puna during the past 30 years has increased at a substantially higher rate than the growth in employment.

Puna is primarily an agricultural district. The area also includes part of the Hawaii Volcanoes National Park, large substandard subdivisions, forest reserves, and several small concentrations of population. Most of the subdivisions were created prior to the adoption of the Zoning Code in 1967 and are in agricultural zones.

Agriculture in the form of truck farming in the Volcano area; papaya in the Kapoho area; and flowers, principally anthuriums and orchids, in the Mountain View, Pahoia and Kapoho areas are important. The papaya and flower industries continue to experience moderate growth. Factors currently limiting growth of these industries are the shortage of labor, housing, processing requirements, and plant disease. Over 90 per cent of the State’s papaya production comes from this County, with the majority from the Puna district. The infestation of Puna papaya by the ringspot virus in the 1990s resulted in 1997 production levels falling 55 per cent from 1992 production levels. It also resulted in the dispersion of papaya acreage to other areas of Puna, South Hilo and Hamakua to escape the virus. With the acceptance of the genetically-engineered and disease-resistant *Rainbow* variety and the recent opening of a post-harvest treatment facility, the future production of papaya within the Puna district is expected to in-

§2.4.1: Puna

crease. The County also produces most of the State's bananas, with the Puna district accounting for a large percentage of production. The banana industry in Puna is expected to grow at a moderate rate.

Geothermal resource utilization is a small part of the existing economy of Puna. Future expansion of the geothermal industry within the district is promising.

Except for the Kulani Prison project, there are no major government installations in the Puna district.

The Kamehameha Schools East Hawaii Campus opened in the Fall of 2001. The campus will be able to accommodate an overall student population of approximately 2,300 students in grades K-12, and become a major employment generator in the Puna District.

The visitor industry has very little visible effect on the Puna district other than some roadside stands and a few visitor accommodations, such as bed and breakfast and vacation-rental operations. There are a number of visitor attractions frequented by tourists, such as the lava-inundated former Kaimu Black Sand Beach area, portion of the Volcanoes National Park, and the Painted Church.

Puna's population will probably continue to grow at a rapid rate. The major sector of its economy will continue to be agriculture, such as papaya, macadamia nuts and flowers. However, there are several problem areas that have already been mentioned as well as others such as capital requirements that have to be overcome for expansion. There is also potential for a limited amount of visitor facilities in the form of small accommodations and support facilities, such as recreational areas, botanical parks, and others. Puna also will continue to serve as a residential area for people working in Hilo.

2.4.1.2 Courses of Action

- (a) Assist the further development of the agricultural industry by providing support services to commodity groups and other organizations such as farmer's cooperatives, protecting important agricultural lands, and requesting and providing necessary capital improvements.
- (b) Resort growth should enhance and be in keeping with the area's rural character.
- (c) Assist the fishing industry through a cooperative effort with State and Federal agencies.
- (d) Support the development and utilization of geothermal resources and by-products consistent with the environmental, social, economic and other goals expressed elsewhere in the General Plan.

2.4.2 South Hilo

2.4.2.1 Profile

| Population | 1980 | 1990 | 2000 | 1980-90 % Change | 1990-00 % Change |
|------------|--------|--------|--------|---------------------|---------------------|
| South Hilo | 42,278 | 44,639 | 47,386 | 5.6 | 6.2 |

Economic Assessment, PKF Hawaii, January 2000
 U.S. Census, 2000
 Hawaii County Department of Research and Development

Population growth in Hilo and in the older plantation based communities on the coast north of the city declined or saw little growth. Between 1990 and 2000, the population for Hilo increased by 6.2 per cent.

Hilo is the County seat and the only metropolitan area on the island. Hilo also functions as the island's industrial, commercial, distribution and population core. Approximately 33 per cent of all Big Islanders live in this city. The rest of the population is scattered throughout the island.

Sugar was one of the largest single industries in South Hilo. The commercial growing of ornamental plants is now the largest agricultural product grown in the district. Bananas and papayas are some of the other major products grown in the district. More than half of the total acreage cultivated statewide for flowers and nursery products are located within the County, which also accounts for over half of the total statewide revenue of flowers and nursery products.

Several kinds of manufacturing operations are located in Hilo, including the processing of food, fruit, livestock, and garment manufacturing.

There were 1,165 visitor accommodation units available in 1998, a decline of 11.3 per cent since 1984 and a 46 per cent decline since its peak in 1976. Hilo continues to attract its share of visitors to the County with approximately 380,000 visitors (30 per cent) in 1997. As the center of business and government within the County, Hilo accommodates numerous business and local travelers for special events such as hula competitions and sporting finals. The South Hilo district will also benefit from the continued growth of the cruise ship industry, which saw a substantial increase in island-wide arrivals from 124,000 in 1997 to 184,000 in 1998 with annual expenditures estimated to range from \$16,000,000 to \$23,000,000. Overall, the future growth in tourism in the South Hilo district is anticipated to remain at current levels.

Hilo with its population size, harbor and airport facilities, higher education complex, and new investment has potential for economic growth. However, many public facilities, such as the airport facilities and the university facilities in Hilo, rely heavily on

§2.4.2: South Hilo

State funds and the County must compete with other areas of the State. The closing of Hilo Coast Processing Company and Hamakua Sugar Company in 1994 resulted in some decline in allied sectors. New economic based activities in East Hawaii are needed if the city is to continue its role as the island's commercial and service center in the future.

There are several significant projects that could propel South Hilo's economy in the near future. Subject to the availability of funding, construction of the Saddle Road improvements could commence in late 2001 and will substantially reduce the commute time between Hilo and Kailua-Kona. Already in operation is a post-harvest fruit treatment plant that will allow a substantial increase in the amount of agricultural products to be exported worldwide. In addition, a call center established in Hilo could ultimately provide as many as 300 new jobs.

2.4.2.2 Courses of Action

- (a) Encourage the State to provide the necessary funds for the development of the university complex and airport facilities. Provide necessary support services and facilities to aid the development of these complexes.
- (b) Continue to implement a program to revitalize historic downtown Hilo.
- (c) Encourage manufacturing operations that utilize local raw materials, such as macadamia nut shells and timber.
- (d) Assist the fishing industry through a cooperative effort with State and Federal agencies.
- (e) Assist in the formulation and implementation of management education and manpower training programs to strengthen the overall skill levels of its work force to be compatible with existing and emerging industries.
- (f) Support the development of a master plan for lands within the vicinity of the University of Hawaii at Hilo to incorporate a "college town" concept utilizing an appropriate mixture of residential, commercial and other land uses to complement the university's infrastructure.
- (g) Explore the feasibility of expanding the Afook-Chinen Auditorium into an athletic-exhibition-conference facility that can attract additional activities and visitors to the Hilo area.
- (h) Support the efforts of the Pacific Aquaculture and Coastal Resources Center to renovate the abandoned sewage treatment plant in Keaukaha into an aquaculture center.
- (i) Coordinate with the University of Hawaii at Hilo to establish an aquacultural program along accessible areas of the Hilo coast for research, demonstration, and development purposes.
- (j) Support the construction and development of the USDA's Pacific Basin Agricultural Resource Center facility.

2.4.3 North Hilo

2.4.3.1 Profile

| Population | 1980 | 1990 | 2000 | 1980-90 % Change | 1990-00 % Change |
|------------|-------|-------|-------|---------------------|---------------------|
| North Hilo | 1,679 | 1,541 | 1,720 | -8.2 | 11.6 |

Economic Assessment, PKF Hawaii, January 2000
 U.S. Census, 2000
 Hawaii County Department of Research and Development

The population in North Hilo has been declining for more than 50 years. However, in the 10-year period from 1990 to 2000, there was an 11.6 per cent increase in population. The major population and service center for the North Hilo district is Laupahoe.

Like Hamakua to the north, the North Hilo district is agriculturally oriented. On the arable lands of the lower elevations from Honohina-Ninole to Ookala, former sugar cane lands are being cultivated in smaller acreages with a diverse range of crops as well as planted in eucalyptus trees. Large tracts of land within the district are used for cattle grazing and logging of native and planted forests. Macadamia nuts, ginger, bananas, tropical foliage, orchids, tropical fruits, cacao, kava, assorted leafy vegetables, papaya and taro are some of the other agricultural products grown in North Hilo.

There are no visitor accommodations in North Hilo. Given current land uses, it is not anticipated that this area will provide overnight visitor accommodations aside from independent bed and breakfast operations.

Economic growth under present conditions is limited in the district. Residents of North Hilo, especially the young, continue to leave the area because of the lack of employment opportunities. Agriculture shows the greatest potential for growth.

2.4.3.2 Courses of Action

- (a) Assist the further development of agriculture. A program to expand agriculture should be developed and implemented.
- (b) Work with community groups and organizations to identify and develop potential cottage industries.
- (c) Support the development of a native hardwood industry.

2.4.4 Hamakua

2.4.4.1 Profile

| Population | 1980 | 1990 | 2000 | 1980-90 % Change | 1990-00 % Change |
|------------|-------|-------|-------|---------------------|---------------------|
| Hamakua | 5,128 | 5,545 | 6,108 | 8.1 | 10.2 |

Economic Assessment, PKF Hawaii, January 2000
 U.S. Census, 2000
 Hawaii County Department of Research and Development

Hamakua's population has grown over the past 30 years, even when faced with the closing of sugar operations in 1994. The continuing growth of the district's population has been largely due to the major resort activities in the neighboring district of South Kohala and the continuing settlement of the rural homestead areas. There has been some internal movement in this district into the town of Honokaa, which represents the commercial and residential center of the district. There are several smaller communities along the Belt Highway that serve primarily as residential settlements related to the former sugar plantations. At the higher elevations, there are scattered homesteads and ranches. Visitor accommodations are available at a 19-unit hotel in Honokaa as well as various bed and breakfast operations scattered throughout the district.

The economic mainstays of this area are cattle, macadamia nuts, and various crops. These are the greatest sources of income and employment for Hamakua. There are numerous cattle ranches and several different varieties of crops in the district. Of these, macadamia nuts are expected to continue to play an important role in the future of agricultural development. Other crops grown in this area are taro, watermelons, tomatoes, ginger, kava, coffee, and other vegetables.

The closing of sugar operations has made lands available for various crops. A large timber operation has initiated plantings of eucalyptus in its effort to establish a 15,000-acre eucalyptus plantation. The investment includes \$29,000,000 in Hamakua and has already created 100 full-time jobs. A 1981 study to identify the best potential forest lands within the County identified 80,000 acres, mostly located along the Hamakua coast between the 1,000 to 3,000-foot elevations.

On July 28, 2000, a joint announcement was made by the Hawaii Forestry and Communities Initiative (Na Hoa Mahi`ai) and the State Department of Land and Natural Resources to cultivate a 40-acre parcel of State land at Ookala with high value hardwoods such as koa, milo, kamani, mahogany, pheasantwood, and narra, with 25 per cent of the area dedicated to the restoration of a lowland native rainforest. The project is unique in that the land, under the jurisdiction of the DLNR Division of Forestry and Wildlife, will be actively managed by a consortium of community groups from the Ookala-Laupahoehoe area, with technical assistance provided by forestry and other natural resource experts from the State, the University of Hawaii, and several federal

§2.4.4: Hamakua

agencies, including the USDA Forest Service and the Natural Resource Conservation Service. Community representation in the project includes the North Hilo Community Council, the Laupahoehoe Train Museum, and the Laupahoehoe High School.

Manufacturing within the district is limited to the processing of macadamia nuts and other agricultural products. The 60-megawatt co-generation power plant at Haina will encourage other manufacturing activities by providing thermal energy (waste heat) that could be utilized for drying of macadamia nuts or aquaculture activities.

The astronomical facilities located atop Mauna Kea are also part of the Hamakua District. The facilities are located within the 11,228-acre Mauna Kea Science Reserve, which includes those lands situated above the 12,000-foot elevation, with the exception of areas within the Mauna Kea Ice Age Natural Area Reserve.

Mauna Kea is considered the world's premier site for ground-based astronomical observatories. Mauna Kea is home to 13 observatories and includes 12 of the world's most state-of-the-art telescopes. More major telescopes are located on Mauna Kea than on any other single mountain peak in the world. Mauna Kea is widely recognized as offering optimum conditions for optical, infrared and millimeter/submillimeter measurements. In addition, the local availability of support technicians and personnel also contribute to make Mauna Kea one of the finest astronomical sites in the world. Astronomy has contributed over \$619,000,000 in capital investments to the State as well as generated approximately 270 permanent jobs.

2.4.4.2 Courses of Action

- (a) Assist the further development of agriculture and continue to cooperate with the agricultural sector and other appropriate agencies to provide the necessary services to assist agriculture.
- (b) Allow the development of limited visitor facilities that will not detract from the natural beauty of the area.
- (c) Develop a tourism industry that will promote small business development by maintaining the plantation heritage of the area.
- (d) Diversify the economic base and enhance historical aspects of the area including existing ranching operations and the former sugar industry.
- (e) Support the growth of a forestry industry within the district.
- (f) Support the growth of astronomical research and development.

2.4.5 North Kohala

2.4.5.1 Profile

| Population | 1980 | 1990 | 2000 | 1980-90 % Change | 1990-00 % Change |
|--------------|-------|-------|-------|---------------------|---------------------|
| North Kohala | 3,249 | 4,291 | 6,038 | 32.1 | 40.7 |

Economic Assessment, PKF Hawaii, January 2000
 U.S. Census, 2000
 Hawaii County Department of Research and Development

Population in North Kohala has grown significantly over the last 20 years. The growth in population between 1980 and 2000 can be attributed to the continuing development of various resort complexes along the South Kohala coast as well as a growing number of people who wish to establish their retirement home within the district. New entrepreneurial activities, both in health and wellness and eco-tourism enterprises, also contribute to the growth in population.

Cattle, nursery products and macadamia nuts are the major agricultural products. On smaller acreages, truck crops are grown. The largest tracts of grazing land extend from the top of the Kohala mountains to Akoni Pule Highway.

Another important source of income and employment is tourism and its related service industries. Chalon International, Inc., a major landowner within the district, has developed plans for a 240-unit resort and residential development adjacent to Mahukona Harbor. Economic conditions in Hawaii and Japan have delayed the construction of this proposed resort. There are many natural and historical amenities within the North Kohala district that are conducive to the development of tourist related facilities. There are many residents of this district who work in the adjoining district of South Kohala.

Besides Chalon International, Inc., other major private landowners within the district include Kamehameha Schools, Parker Ranch Foundation Trust and Kahua Ranch. Together with the State of Hawaii, these landowners account for 90 per cent of the land in this district.

The Upolu Airport can serve a limited number of flights. There are no regularly scheduled flights to Upolu by the two primary inter-island carriers. Upolu Airport is used occasionally by sightseeing air taxi services using both fixed wing aircraft and helicopters, flight training activities, medical emergency flights, and the military.

2.4.5.2 Courses of Action

- (a) Aid in the expansion of agriculture through the protection of important agricultural lands.
- (b) Resort facilities compatible with the physical, social and economic goals of the residents of the district should be considered.
- (c) Encourage the establishment of an open farmer’s market in North Kohala.
- (d) Assist in the formulation and implementation of education and manpower training programs to strengthen the overall skill level of the local residents to compete in existing and emerging sustainable and environmentally sound industries and businesses.
- (e) Work with communities and residents (community groups and organizations) to identify and develop potential cottage industries and provide flexibility in land use to accommodate these potential cottage industries.
- (f) Support efforts to promote small business development that is consistent with the rural, agricultural, and historic character of the area.
- (g) Assist the communities and residents in diversifying the economic base in ways that are consistent with the rural, agricultural, and historic character of North Kohala.

2.4.6 South Kohala

2.4.6.1 Profile

| Population | 1980 | 1990 | 2000 | 1980-90 % Change | 1990-00 % Change |
|--------------|-------|-------|--------|---------------------|---------------------|
| South Kohala | 4,607 | 9,140 | 13,131 | 98.4 | 43.7 |

Economic Assessment, PKF Hawaii, January 2000
 U.S. Census, 2000
 Hawaii County Department of Research and Development

The primary economic activities of this area are tourism, cattle ranching, agriculture, public and private educational institutions, scientific research associated with the observatories located on Mauna Kea and health and wellness organizations.

Due to the growth in tourism within the district, the population of South Kohala increased dramatically over the past 30 years. The benefit of this growth for the residents of South Kohala is the lowest unemployment rate and the highest median household income of all the districts for 1997.

Kawaihae Harbor is the second deepwater port on the island. The Kawaihae small boat harbor adds to the inventory of amenities in the district and provides limited recreational and commercial sport fishing activities.

§2.4.6: South Kohala

The Mauna Kea Beach Hotel, which began operations in 1965, opened the door to resort development of this area. South Kohala has evolved into one of the world's premier resort destinations with luxury hotel complexes. Hunting on the slopes of Mauna Kea and the Kohala mountains, deep sea fishing, world-class golf courses, hiking trails, historic sites, sandy beaches, and a diversity of climates are some of the attractions available to tourists.

There is considerable investor interest in South Kohala. The three large resort complexes in the district - Mauna Kea Resort, Mauna Lani Resort, and the Waikoloa Beach Resort - currently account for 40 per cent of the total hotel rooms within the County. The South Kohala district is one of the best destinations in the State for world-class golf courses. During the period between 1980 and 1998, ten properties were developed totaling 3,400 visitor units. The larger of these resort properties include the 547-unit Outrigger Waikoloa Beach Hotel, the 350-unit Mauna Lani Bay Hotel & Bungalows, the 1,240-unit Hilton Waikoloa Village, the 539-unit Orchid at Mauna Lani, and the 351-unit Hapuna Beach Prince Hotel.

Although tourism is currently the leading economic industry in the district, the area is also well known for cattle ranching, vegetable production, egg production, and other forms of agriculture. Waimea is one of the most productive areas for vegetable crops on the Big Island. Cabbages, celery, lettuce, daikon (turnip), peppers, broccoli and carrots are just some of the vegetables grown. Experiments are being conducted on different crops as well as on the improvement of those presently grown. The agricultural industry, especially truck farms, has potential for further expansion. This industry, faced with competition for resources from tourism and other urban forces, needs governmental assistance.

The cattle ranching industry utilizes most of the land area within the district with pastures situated on the higher slopes of the mountains and extending down to the sea. Parker Ranch, one of the largest privately owned ranches in the world, has its headquarters in Waimea. The closing of all feedlots within the County has resulted in the export of 90 per cent of all cattle to mainland feedlots. Hawaii cattle producers need to expand their presence in the local market in order to keep cattle in Hawaii for finishing and local consumption.

The educational sector includes Hawaii Preparatory Academy (HPA) with a 1999 total enrollment of 578 students in grades K through 12, which includes 190 boarders from grades 6 through 12. In addition, Parker School is a day school with a 1999 enrollment of 129 students. Waimea has three performing arts venues: Kahilu Theatre, Gates Performing Arts Center, and Parker School Auditorium.

The Canada-France Hawaii Telescope on Mauna Kea has its base facility in Waimea. The base has a staff of 51 and an annual operating budget of \$6,200,000. As several planned telescopes are built on Mauna Kea, additional base facilities may choose to lo-

cate in Waimea due to its desirable environment. Waimea is also home to the headquarters of the W.M. Keck Observatory on Mauna Kea, the largest optical and infrared telescopes in the world. The headquarters employs about 80 people and has an annual operating budget of \$10,000,000.

2.4.6.2 Courses of Action

- (a) Assist in the development of agriculture by protecting important agricultural land from urbanization, providing or having provided the necessary capital improvements, such as water, and working cooperatively with the agricultural sector and government.
- (b) Work closely with the State and the Department of Hawaiian Home Lands to provide adequate land close to Kawaihae Harbor for industrial activities.
- (c) Recognize the diversity of climate, the quality of the ocean water and the natural beauty of the hills as vital economic and social assets of the region to be protected through appropriate regulations.
- (d) Resort development in the district shall be in an orderly fashion and consistent with the physical and social goals of the residents of the area. Utilize tools such as incremental zoning to insure development that will best meet the needs of the County.
- (e) Encourage the preservation of the rural, ranching character within the town of Waimea.
- (f) Support the growth of astronomical research and development.

2.4.7 North Kona

2.4.7.1 Profile

| Population | 1980 | 1990 | 2000 | 1980-90 % Change | 1990-00 % Change |
|------------|--------|--------|--------|------------------|------------------|
| North Kona | 13,748 | 22,284 | 28,543 | 62.1 | 28.1 |

Economic Assessment, PKF Hawaii, January 2000
 U.S. Census, 2000
 Hawaii County Department of Research and Development

Spurred primarily by the employment opportunities created by the expanding visitor industry, population has greatly increased in North Kona over the last 30 years. The growth of the visitor industry in recent years can be largely attributed to the expansion of runway and terminal facilities at Kona International Airport at Keahole, which now permits the arrival of national and international direct flights.

Tourism continues to expand in North Kona. Currently, there are about 4,081 visitor units in the area. During the period of 1980 to 1998, six new resort properties were developed in North Kona for a total of 900 visitor units, including the completion of the

§2.4.7: North Kona

243-unit Hualalai Resort at Kaupulehu and 263-time share unit Kona Coast Resort in Keauhou. North Kona now accounts for over 45 per cent of total hotel rooms on the island.

The visitor industry in North Kona is expected to grow at a moderate rate. Once the major visitor industry area on the island, the North Kona district now shares this distinction with the South Kohala district. Many of North Kona's aging hotel properties need major renovation. This effort began with the renovation of the Keauhou Beach Hotel in 1999.

Most of the Big Island's coffee production is in the North and South Kona Districts, which has been producing coffee since the 1800s. Between 1982 and 1995, the Kona coffee industry experienced sales fluctuations between \$2,100,000 and \$8,700,000. Since 1995, the value of Kona coffee sales has steadily increased to approximately \$16,200,000 in 1997. Coffee production on the other islands has far surpassed this island; which now accounts for one-third of the coffee produced statewide. However, the market and price for Kona coffee continues to grow due to its distinct flavor and quality unique to coffee grown elsewhere in the world.

Besides coffee, agricultural enterprises include cattle ranching and the growing of fruits, macadamia nuts, and vegetables, particularly tomatoes.

Timber and fishing are small industries in Kona. Logging of native hardwood at one time provided a major source of income in the district. The Kailua-Kona Wharf is considered a major center for big game fishing and international tournaments usually held annually.

Quarrying operations for building materials are also conducted in North Kona. The Old Kailua Industrial Area and the Kaloko Industrial Area provide the largest concentration of industrial activities within West Hawaii. These industrial areas accommodate a wide range of manufacturing, service, wholesale and retail activities.

The North Kona district was once the major visitor destination on the island. However, this distinction is now shared with the South Kohala district due to the recent development of numerous hotel complexes along the South Kohala coast. While the majority of visitor accommodations were once centered in Kailua-Kona, visitor accommodation facilities now stretch from the Kona Village Resort to Keauhou. The North Kona district includes approximately 4,081 visitor units including hotels, resort condominiums, bed and breakfast operations and other transient units. The 1,900-acre Keauhou-Kona area provides approximately 1,300 hotel and resort-condominium units.

There are several government projects of significance to the district's economic future. A small boat harbor at Honokohau has been constructed just outside of Kailua Village.

§2.4.7: North Kona

This facility will complement the already world famous big game fishing of the area. Further north along the coast, the runway at Kona International Airport at Keahole has been expanded to accommodate larger aircraft utilized for overseas flights. The State has completed an update of the master plan for the Kona International Airport at Keahole, which will include extensive terminal, runway and support facility improvements.

The Natural Energy Laboratory of Hawaii Authority (NELHA) at Keahole Point, an ocean science and technology park utilizing deep cold seawater pumped from 2,000 feet off of Keahole Point, has demonstrated the effectiveness and feasibility of various technologies and industries that use this unique, cold-water resource. Ocean thermal energy conversion, aquaculture, air conditioning of buildings using cold seawater, and the growing of cold-climate vegetables and fruits are just some of these successful activities. In 1999, the 870-acre NELHA complex hosted 26 projects employing more than 160 individuals and contributing approximately \$30,000,000 annually to the local economy.

Kona is considered the center for government, commercial and industrial activities for West Hawaii. In addition to being the center for government, retail, and banking services, Kona is also home to “big-box” retailers such as Costco, K-Mart, and WalMart and international sporting events such as the IronMan Triathlon, the Hawaiian International Billfish Tournament, and the Senior PGA Tournament of Champions at the Hualalai Resort.

2.4.7.2 Courses of Action

- (a) Resort development in the area shall be in balance with the social and physical goals as well as economic desires of the residents of the district. Necessary pollution controls shall be available prior to development. Other necessary support facilities such as transportation and nursery facilities shall also be provided.
- (b) Assist in the further development of agriculture, including forestry and aquaculture activities. Necessary capital improvements that will aid agriculture, such as water, should be given priority for funding.
- (c) Continue to encourage development of the Natural Energy Laboratory of Hawaii Authority as a marine research and commercial facility.
- (d) Encourage and support the development of Hawaii Community College in West Hawaii, including the University of Hawaii Center.
- (e) Assist the fishing and boating industry through a cooperative effort with State and Federal agencies.
- (f) Recognize the natural beauty of the area as a major economic and social asset. This resource should be protected through appropriate review processes when development is proposed.
- (g) Improve Kailua Village to maintain its viability as a popular visitor destination.

§2.4.8: South Kona

(h) Increase affordable housing opportunities in the Kailua-Kona area.

2.4.8 South Kona

2.4.8.1 Profile

| Population | 1980 | 1990 | 2000 | 1980-90 % Change | 1990-00 % Change |
|------------|-------|-------|-------|---------------------|---------------------|
| South Kona | 5,914 | 7,658 | 8,589 | 29.5 | 12.2 |

Economic Assessment, PKF Hawaii, January 2000
U.S. Census, 2000
Hawaii County Department of Research and Development

South Kona's population has increased by approximately 12 per cent between 1990 and 2000 and 30 per cent in the previous decade. The major trade and population concentrations are along the Mamalahoa Highway at Kealahou, Captain Cook, and Honaunau.

The primary economic activity of this district is agriculture, with its most important industries being coffee growing and processing, macadamia nuts, citrus fruits and cattle ranching. Within the South Kona district, roughly 4,000 acres of macadamia nut orchards are planted with approximately 237,000 macadamia nut trees. The operation entails the second largest macadamia nut processor in the State, accounting for roughly 20 to 25 per cent of all macadamia nut production.

The number of coffee farms has fluctuated over the years with a high of 635 farms in the late 1980s to a low of 550 farms in 1996. During the same period, coffee acreages have fallen from 3,000 to 1,960 acres. However, the total value of coffee sales within the County has recovered from its low of \$3,700,000 in 1992 to a high of \$16,200,000 in 1997. Although the price of Kona coffee has been quite volatile, it is still considered one of the most promising agricultural products grown within the County. Compared to other coffee producing areas of the world, the Kona coffee growers have a comparative disadvantage because of higher wages paid to laborers and the topography of prime Kona coffee lands, which limit farmers to manual harvesting methods compared to mechanical harvesting methods utilized by coffee growers on other islands and in other parts of the world. However, the manual harvesting methods utilized by Kona coffee growers may be a significant factor contributing to the superior taste of Kona coffee compared to other coffee grown throughout the State and the world.

Also grown in the South Kona district are bananas, citrus crops (oranges and tangerines), avocado, vegetables and other truck crops, and macadamia nuts. Cattle ranching is also one of the prominent industries in the district.

Manufacturing in South Kona is confined to coffee roasting and macadamia nut processing.

Unlike the North Kona area, the South Kona district has limited accommodations for overnight visitors. There are approximately 88 units located at Captain Cook (Manago Hotel), catering primarily to local business travelers and agricultural workers. A 730-lot agricultural-residential and golf course community and 80-unit private members' lodge development (Hokulia) is being developed north of Kealahou Bay in South Kona. This development will cater primarily to out-of-state second homebuyers.

2.4.8.2 Courses of Action

- (a) Assist the further development of agriculture by protecting important agricultural land from urbanization, and by providing necessary resources, such as water.
- (b) Resort development in the area should not destroy the natural resources and historical significance of the area.
- (c) Assist the fishing industry through a cooperative effort with State and Federal agencies.
- (d) Encourage ocean-based industries, such as aquaculture, in the area.
- (e) Encourage eco-tourism and agricultural tourism as regional opportunities.
- (f) Establish buffers on undeveloped lands around Kealahou Bay to assure preservation of the region's unique environment and cultural resources.

2.4.9 Ka'u

2.4.9.1 Profile

| Population | 1980 | 1990 | 2000 | 1980-90 % Change | 1990-00 % Change |
|------------|-------|-------|-------|------------------|------------------|
| Ka'u | 3,699 | 4,438 | 5,827 | 20.0 | 31.3 |

Economic Assessment, PKF Hawaii, January 2000
 U.S. Census, 2000
 Hawaii County Department of Research and Development

Located on the southern and eastern flanks of Mauna Loa, the Ka'u district is the largest on the Big Island. Although Ka'u is the largest of the nine districts on the island, the population of Ka'u is the second smallest only to that of North Hilo. Between 1990 and 2000, the Ka'u District saw an approximately 31 per cent increase in its population. Much of the increase in the Ka'u population has been concentrated in Ocean View and other smaller communities.

Agriculture is the economic mainstay of the Ka'u region. Coffee, orchids, vegetables, flowers, cattle, and macadamia nuts are grown in this district. Approximately

§2.4.9: Ka'u

\$5,000,000 has been invested in an effort to establish a forestry industry on approximately 5,000 acres that could generate 30 to 40 new jobs.

Within the Ka'u area are several cattle ranches that utilize vast acreages of grazing lands. Although employment in this sector is not large, it plays an important role in the area's economy.

The macadamia nut industry remains one of the primary industries within the district. However, growing competition from foreign producers are beginning to affect the industry due to increased worldwide production, weakness in the Asian economy, and more aggressive marketing of these foreign-grown macadamia nuts in the United States. Similar to the competition faced by the once-dominant sugar industry, future growth of the macadamia nut industry must quickly respond to the threat of foreign competition by focusing on the quality of Hawaii's macadamia nuts and developing alternative markets for the nuts and its by-products.

C.Brewer & Co., Ltd., the major landowner in this area, continues its efforts to explore new economic initiatives within the Ka'u District in the absence of its sugar industry. In addition to maintaining the largest macadamia nut orchard in the Ka'u District, C. Brewer & Co., Ltd. is also engaged in and promotes other forms of agriculture such as vegetables and coffee production. The establishment of a forestry industry upon lands once utilized for sugar cultivation is also being explored.

The existing Punaluu Resort and Seamountain Golf Course complex is the center of tourism activity within the Ka'u District. However, the only accommodations available at this complex is the 56-unit Colony One at Sea Mountain. The golf course remains in operation, but no other facilities or amenities are available. The 12-unit Shirakawa Motel in Waiohinu and various bed and breakfast operations provide the only other visitor accommodations within the district.

2.4.9.2 Courses of Action

- (a) Balance development with the social and physical environment of the area. Provisions for orderly development, housing, and pollution controls shall be implemented.
- (b) Assist the fishing industry, other ocean based industries, and aquaculture through a cooperative effort with State and Federal agencies.
- (c) Recognize the natural beauty of the area as a major economic and social asset. Protect this resource through appropriate review processes when development is proposed.



ENERGY

3.1 INTRODUCTION AND ANALYSIS

For the foreseeable future, Hawaii will continue to be dependent on petroleum to meet its energy demands. Fortunately, Hawaii is endowed with a variety of natural energy resources that are renewable for low polluting sources of electricity. Hawaii's dependence on imported petroleum provides the incentive for the promotion of energy efficiency and the development of technologies to harness natural energy resources (solar, hydrologic, wind, and geothermal) and to convert solid waste into a fuel resource.

Petroleum provides up to 75 per cent of the Island's energy needs. All of the petroleum used in the State must be imported in one of several forms. Most of the petroleum consumed in the State is imported as crude oil, which is then processed at two local refineries, Chevron and Tesoro, both located at Barber's Point, Oahu in the Campbell Industrial Park. Both refineries receive crude oil from Indonesia, Alaska, Africa, Malaysia, and the Persian Gulf. Petroleum products, primarily jet fuel, fuel oil, and propane, are also imported from California, the Caribbean, Singapore, and other areas to meet the demand not met by the refineries. Propane, which is widely used on the Island of Hawaii, is also manufactured from petroleum on Oahu. Petroleum products are received at the Kawaihae and Hilo Harbors.

Under normal circumstances, an estimated 30-day aggregate supply of most petroleum products is stored at the oil terminals and tank farms. A major interruption of petroleum supply due to a lengthy maritime strike, a disaster at the source of crude oil supply, the sinking of a petroleum tanker or barge, or an aviation disaster at Campbell Industrial Park could seriously affect the County of Hawaii's petroleum supply. The island's economy is also vulnerable to interruptions in the supply of oil from the Middle East.

The County of Hawaii must decrease economic vulnerability and energy costs. To do so, the County must combine the efforts of energy efficiency and the development of natural renewable energy alternatives that reduce the dependence on imported fossil fuels and increase energy self-sufficiency.

Electricity

Electricity is a major form of energy utilized on the island of Hawaii. The Hawaii Electric Light Company, Inc., (HELCO) which is regulated by the State, owns and operates a number of power generation plants in the County. Most of these plants operate on steam or

§3.1: Introduction And Analysis

combustion gases and burn imported fuel. Two plants in Hilo generate power through hydroelectric means and a South Kohala location produces wind energy. A few Independent Power Producers (IPPs) generate power using various fuels and resources, and sell energy to HELCO. The methods of power production include geothermal, hydropower, wind, coal, and oil plants. Most recently, the construction of a 60 megawatt (MW) co-generation power plant in the Hamakua district will provide a firm power source and the excess heat generated by the power plant will be used to further develop agriculture and product manufacturing in the district.

The average annual residential power used in 1990 was 6,794-kilowatt hours (kWh). In 1999, the average residential usage decreased to 6,563-kilowatt hours.

Table 3-1. Electric Utility for the County of Hawaii

| Customers | Number of Customers & Percent of Total Number | Power Sold (1,000 kWh) & Percent of Total Sold | Ratio of Power Sold (1000 kWh) to Customer |
|--------------------------------|---|--|--|
| Residential | 52,277 = (84%) | 343,085 = (37%) | 6.563 to 1 |
| General Loads | 9,654 = (15%) | 308,493 = (34%) | 31.955 to 1 |
| Commercial Cooking and Heating | 396 = (Less than 1%) | 25,964 = (3%) | 65.566 to 1 |
| Large Power Service | 65 = (Less than 1%) | 234,889 = (26%) | 3,613.677 to 1 |
| Street Lighting | 86 = (less than 1%) | 3,879 = (Less than 1%) | 45.105 to 1 |
| Total | 62,478 = (100%) | 916,310 (100%) | 14.666 to 1 |

Hawaiian Electric Company, 1999
Estimate - Planning Department

Residential refers to single-metered residential customers and may include condominiums for visitor use but excludes master-metered apartment and condominium buildings used by residents classified as commercial customers. General Loads refer to general light and/or power loads supplied through a single meter. Commercial Cooking and Heating applies only to commercial heating (heat pump water heaters), air conditioning, and refrigeration service. Large Power service is applicable to large light and/or power service supplied and metered at a single voltage and delivery point.

The table presented on the previous page clearly indicates that of the 62,478 customers of electrical power, approximately 84 per cent are residential customers. However, of the 916,310 total kilowatt hours used, residential customers accounted for approximately 37 per cent. This yields a ratio of about 6,563 kilowatt hours per customer as opposed to Large Power Service customers that account for less than 1 per cent of the customer base but use 26 per cent of the total kilowatt hours. These customers yield a ratio of 3,613,677 kilowatt hours per customer.

Power rates on this island are among the highest in the nation. One factor that contributes to the high cost of power is the present method of power generation. Most of the electricity is obtained through the burning of imported oil. The cost of fuel, coupled with transportation costs, cause higher rates. Additionally, the size of the service area and length of transmission and distribution lines necessary to transfer the power to the load centers are significant factors. A good example is the fast growing loads in West Hawaii. The major generating plants are located in East Hawaii. This requires generating more in East Hawaii to compensate for losses in lines going over to West Hawaii. Other factors creating higher costs are the small market and the sparseness of population in a relatively large service area.

Except in a few instances, most of the power lines in the County are overhead lines. Although underground wiring has an aesthetic desirability, there are several problems in establishing such a standard. Underground power lines will probably last longer but cost more to install, especially in rocky areas. There is a problem of common sharing of trenches with other utilities. Another problem is repair and maintenance, for while broken lines will probably occur infrequently, they will be more difficult to locate. There has been, however, considerable progress in solving the technological problems concerning underground power lines.

As affluence of the population increases, the consumption of power tends to accelerate faster than population growth. Studies of sources of energy other than the burning of fuel are being conducted. On September 1, 1998, HELCO submitted its second Integrated Resource Plan (IRP) to the Public Utilities Commission with input from a public advisory group.

Electrical Energy Self-Sufficiency for the Big Island

The County of Hawaii must strive to attain energy self-sufficiency in order to minimize its dependence on imported fossil fuels. A commitment by both the government and the public must continue in research, planning, and development to attain the goal of energy self-sufficiency for the County of Hawaii.

As a result of the 1974 and 1978 oil crisis, there has been concern over Hawaii's dependence on imported petroleum. In 1974 and 1976, the State Legislature enacted several significant bills designed to promote the research and development of natural energy resources, and the conservation of energy in order to foster a greater independence from imported fossil fuels.

The State Legislature adopted Act 237 (Chapter 196, H.R.S.) in 1974, which created the position of a State Energy Resources Coordinator to review and formulate existing and proposed energy resource programs.

§3.1: Introduction And Analysis

Also in 1974, the State Legislature established the Hawaii Natural Energy Institute (HNEI, Act 235) to foster development of local natural energy research at the University of Hawaii. The HNEI maintains cooperation and coordination between all levels of government and private organizations involved with energy related projects with potential for Federal funding, and serves as the central source of information on natural energy policies and programs.

Act 236, adopted by the State Legislature in 1974, established the Natural Energy Laboratory of Hawaii (NELH) at Keahole (North Kona, Hawaii) to provide essential support facilities for future electrical energy research programs. The legislature selected Keahole Point through the criteria for development of three of the proposed natural energy programs (OTEC, Biomass conversion, and direct solar energy utilization systems).

In 1976, the State Legislature adopted Act 189 which complemented the development half for energy self-sufficiency by the creation of tax incentives for the installation and use of "solar energy devices" and "alternate energy improvements" to promote energy conservation. These devices and improvements increase the level of efficiency, and decrease the utilization of electrical power that accounts for 42 per cent of the total energy demand in the County of Hawaii.

In January of 1980, a final report prepared for the County of Hawaii entitled "Energy Self-sufficiency for the Big Island of Hawaii" was released. The report recommended that the County government provide a favorable climate for energy savings and new energy production. It also recommended establishing an Office of Energy Coordinator. The Energy Coordinator:

- Coordinates and provides information regarding conservation and energy production;
- Organizes ride sharing and travel reduction programs;
- Assists business in obtaining information and financial support for energy-related development;
- Funds necessary information gathering programs;
- Monitors the progress of energy departments;
- Recommends changes in the county's energy program;
- Analyzes the impact of proposed developments on the energy balance of the Island.

In addition, the development of naturally occurring energy resources will become an increasingly important factor in determining future industrial activity on the Island of Hawaii.

Gas

Propane gas is widely available and is a major source of energy for the Island of Hawaii. The two primary methods used in delivering gas are via an underground pipeline or tank/cylinder refill. The Public Utilities Commission regulates the underground gas delivery system in Hilo and along Alii Drive in Kailua-Kona. Gas is delivered by tanks or cylinders for the remainder of the island.

The use of propane gas diversifies the island's energy supply and creates less pollution. Compared to electricity generation and diesel emissions, propane offers a cleaner, less polluting fuel. Alternatives like propane gas offer opportunities to lessen the island's dependence on electricity and minimize land use conflicts created by the siting of large-scale electric generation, transmission and distribution facilities.

Propane can be used for self-generation (e.g. cogeneration, micro turbines) for large customers, thereby delaying the need to site and construct large, centralized electric generation facilities.

Geothermal Energy

Geothermal Energy is natural heat energy from the earth that can be harnessed for direct thermal use and for electrical power generation. The four basic ways that this type of natural heat energy may be found are steam, hot water, magma, and hot dry rock.

Geothermal drilling on the Big Island started in the early 1960's. Initial wells were either found to be unsuccessful or once drilled, were not further developed.

In 1972, the Hawaii Geothermal Project (HGP) was organized to investigate the development of geothermal energy in Hawaii, as a cooperative project involving Federal, State, County, and private funds. In April 1976, a successful well was completed near Kapoho in the Puna District, and HGP installed a power plant to demonstrate that geothermal energy is an economically viable natural energy alternative for the Big Island. The plant commenced operations in 1982 and ceased in 1989.

In 1983 and with subsequent amendments, the Legislature amended the State Land Use Law, Chapter 205, Hawaii Revised Statutes, by authorizing the State's Board of Land and Natural Resources to conduct a county by county assessment of areas with geothermal potential for the purpose of designating geothermal resources subzones. Geothermal resource subzones may be designated within the urban, rural, agricultural and conservation land use districts. Only those areas designated as geothermal resource subzones may be utilized for the exploration, development or production of electrical energy from geothermal resources. Other amendments to the State Land Use law provide authority to regulate the direct use applications of geothermal resources.

§3.1: Introduction And Analysis

In addition, the 1983 Legislature set criteria for designating geothermal resource subzones. Three geothermal resource subzones were established by this legislative method. The Board of Land and Natural Resources has subsequently designated the Kapoho, Kamaili, Kahaualea, and Kilauea Middle East Rift Geothermal Resource Subzones. The geothermal resource subzones are shown on the Land Use Pattern Allocation Guide (LUPAG) map.

In April 1993, Puna Geothermal Venture (PGV) completed its geothermal power plant on the Kapoho Subzone on the East Rift Zone. The geothermal power plant uses steam and steam separated from hot water or brine resources at depths of around 5,000 feet below the surface. The closed loop system injects the spent fluids into injection wells at depths of 7,000 feet to be recycled. Although PGV currently produces 30 megawatts of power to the HELCO grid, PGV has been permitted under Geothermal Resource Permit No. 2 to provide up to 60 megawatts of geothermal power. PGV has been supplying approximately 25 per cent of the electricity for the County of Hawaii. Geothermal power generation has displaced nearly 110 million gallons of fuel oil that would have been used for electricity production. The reduction in fuel oil use has resulted in a reduction in carbon dioxide and other emissions common to fossil fuel plants and contributed to a cleaner environment in Hawaii.

Hydroelectric Power

Hydroelectric power is one of the oldest generators of electrical energy. On the Big Island, hydroelectric power fulfills about 5 per cent of the County's electrical energy demand at any given time.

On the Big Island, the percent of total demand supplied by hydroelectricity will probably not increase due to the reliance on normal stream flows and the lack of impoundment required to store enough water for continuous or increased energy output. However, small-scale hydroelectric units have been constructed at Hawi, Onomea, Wailuku River in Hilo, and Waimea. The Wailuku River Hydroelectric facility has the capacity to supply 11 megawatts of power to the electric power grid.

Solar Energy

Solar energy is the basis of many natural energy alternatives in Hawaii. Solar energy generates the global winds; stores energy in biomass through photosynthetic activity; warms the oceans, produces electrical power directly via photovoltaic cells; and can be used directly for heating through solar heat collection devices.

There are two direct forms of solar energy applicable to households; solar heat collection and solar light energy to electrical power via photovoltaic cells.

§3.2: Goals

electricity using coal and fuel oil. Other uses of biomass are currently being reviewed by both the public and private sectors.

Biomass conversion is one of the proposed projects of the NELH program at Keahole point, and involves the cultivation and harvest of plant and animal life forms as a natural energy alternative.

Biomass can also be considered solid waste, since it is the basis for most of mankind's organic refuse, and can be processed into ethyl alcohol. Alcohol fuel is adaptable for use in hydrocarbon combustion systems that account for about 58 per cent of the total energy demand of Hawaii County. Through combustion, alcohol can generate electrical power (via heat and steam) which represents the remaining 42 per cent of the County's total energy demand.

Ocean Thermal Energy Conversion

The oceans are the earth's largest solar energy collector and storage system, covering approximately 70 per cent of the earth's surface. Ocean Thermal Energy Conversion or OTEC is a power production method by which energy is derived from the difference in temperatures between the warm surface and cold deep ocean waters. In 1974, the Natural Energy Laboratory of Hawaii (NELH) was founded. In establishing the NELH, the Hawaii State Legislature set aside 321 acres of land for research and development of alternative energy resources, primarily OTEC.

In 1984, The State Legislature set aside an additional 547 acres of land adjacent to NELH for the commercial expansion of successful NELH research projects. This area was called the Hawaii Ocean Science and Technology (HOST) Park. However, in 1990 the legislature combined NELH and HOST Park into the Natural Energy Laboratory of Hawaii Authority (NELHA). There are now 26 tenant companies that operate at NELHA.

OTEC research began in earnest in 1982 following the construction of the laboratory and administration buildings and deployment of the first 30 centimeter diameter, 600 meter intake deep sea water pipeline. Currently, NELHA continues to conduct experiments and is working with other organizations to plan the construction of a 1 megawatt OTEC experimental facility and additional ocean pipelines for sufficient water supply.

3.2 GOALS

- (a) Strive towards energy self-sufficiency.
- (b) Establish the Big Island as a demonstration community for the development and use of natural energy resources.

3.3 POLICIES

- (a) Encourage the development of alternate energy resources.
- (b) Encourage the development and use of agricultural products and by-products as sources of alternate fuel.
- (c) Encourage the expansion of energy research industry.
- (d) Strive to educate the public on new energy technologies and foster attitudes and activities conducive to energy conservation.
- (e) Ensure a proper balance between the development of alternative energy resources and the preservation of environmental fitness and ecologically significant areas.
- (f) Strive to assure a sufficient supply of energy to support present and future demands.
- (g) Provide incentives that will encourage the use of new energy sources and promote energy conservation.
- (h) Seek funding from both government and private sources for research and development of alternative energy resources.
- (i) Coordinate energy research and development efforts of both the government and private sectors.
- (j) Encourage the continuation of studies concerning the development of power that can be distributed at lower costs to consumers.
- (k) Strive to diversify the energy supply and minimize the environmental impacts associated with energy usage.
- (l) Continue to encourage the development of geothermal resources to meet the energy needs of the County of Hawaii.
- (m) Encourage the use of solar water heating through the continuation of state tax credit programs, through the Building Code, and in County construction.
- (n) Encourage energy-saving design in the construction of buildings.
- (o) Support net-metering and other incentives for independent power producers.

3.4 STANDARDS

- (a) New power plants shall incorporate devices that minimize pollution.
- (b) Applicable standards and regulations of Title 11, Chapter 46, “Community Noise Control” of the Hawaii Administrative Rules.
- (c) Applicable standards and regulations of Title 11, Chapter 59, “Ambient Air Quality Standards” of the Hawaii Administrative Rules.
- (d) Applicable standards and regulations of Title 11, Chapter 60.1, “Air Pollution” of the Hawaii Administrative Rules.

§3.4: Standards



ENVIRONMENTAL QUALITY

4.1 INTRODUCTION AND ANALYSIS

The people of the County of Hawaii live in an environment with qualities that other areas have long since lost. Economic expansion and population growth in the County are bringing about more demand for products, transportation, services, energy, and other necessities that could affect the environmental quality of the County.

The County's basic industries, agriculture, tourism, and scientific and technological enterprises, depend upon a "clean" environment for optimum growth. The agricultural industry depends upon the availability of clean air, soil, and water. The island's major visitor attraction, especially for tourists from large urban centers, is its natural beauty accentuated by the quality of the air, land, and water. The environmental quality of the County thus not only enhances the quality of life for its residents, but is also a major economic asset.

In order to maintain an ecological balance for the biological, physical, social, and psychological well-being of the island community, it is essential to control pollution, develop more effective solid waste and sewer treatment programs, control soil erosion, water runoff, and sprawl development, as well as protect endangered plants and animal species. Greatly altering aspects of the ecological system could destabilize its existing balance and translate into high economic and social costs. Increasing population and urbanization place a greater demand on the limited natural resources, making their utilization and protection a vital concern to the people of the County of Hawaii. The increasing number and affluence of residents and visitors will increase the rate of consumption of local resources, the amount of sewage and solid waste (litter, junk cars, and other scrap metal), the demand for electrical power that will necessitate additional sources, and the number of motor vehicles in use. In urbanizing areas, the generation of pollutants will be greater with increased density and intensified use of the land.

Pollutants may be classified by characteristics, such as organic or inorganic, by stimuli, or by the type of environment affected, such as air, land, or water. Legislation relating to the appropriate disposition of specific pollutants is administered by Federal, State, and County agencies. The large area of the County makes it difficult to adequately monitor and enforce environmental quality standards. The General Plan is concerned primarily with those controls that can properly be formulated and enforced by County agencies.

§4.1: Introduction And Analysis

Current sources of pollution are a problem not only in the amount and type of discharge but also in patterns of dispersal that cause local concentrations of pollutants. There is also a lack of basic information on the existing condition of the County's environment. This is needed to establish a baseline from which future deterioration of the air, land, water, and noise levels can be measured. In order to prevent, abate, and control pollution, deteriorating conditions must be recognized before they reach critical proportions.

Air

The County of Hawaii, along with the other counties comprising the island State, enjoys the unique situation of being geographically isolated from any large land mass and major sources of man-made pollutants. The island's geographical isolation combined with very minimal locally generated man-made air pollution has contributed toward the Island of Hawaii's world wide recognition for the clarity of its air at the summits of Mauna Kea and Mauna Loa. These sites offer some of the best areas in the world for astronomy, combining optical clarity and accessibility.

As in any metropolitan area, though, there is some air pollution. The major sources of air pollution are open burning (by permit only), sprayed agricultural chemicals, modes of transportation, and fixed combustion sources such as power plant emissions. Natural pollutants are also contributing factors. These can be organic, including plant pollens and spores, or inorganic, including airborne dust and volcanic gases. Salt laden ocean spray, though not a pollutant in itself, is a contributing factor towards increased amounts of suspended particulate matter.

Prevailing northeast trade winds and diurnal land and sea breezes sculpted by the Big Island's topography forms air circulation patterns that can create local concentrations of pollutants. The windward or eastern coast is dominated by trades, while on the leeward coast, the side of the island sheltered from the trade winds, the diurnal land - warmed, upslope winds of the day and the cooling, nightly downslope winds prevail. In areas where the topography favors a confluence of air currents, the potential is great for hazy conditions to develop, especially if vehicular, volcanic, and other air pollution sources increase.

Volcano induced smog, known since the 1950s as vog, has been a long standing issue of concern. In 1983, Kilauea Volcano began a long eruptive cycle at Pu'u O'o with brief pauses between eruptive phases. Volcanic gases are released at the rate of about 385 tons per day during eruptive pauses, and 2,000 tons per day during active eruptions. Volcanic gases are composed primarily of sulfur, silicon, sodium, and chlorine with lesser amounts of potassium, calcium, magnesium, aluminum, titanium, and iron. The sulfur, measured in the form of sulfur dioxide, is believed to be oxidized into sulfuric acid, an ingredient in acid rain, in the presence of sunlight and water.

§4.1: Introduction And Analysis

The effect of emissions from Kilauea Volcano on the acidity of rain during noneruptive periods rapidly decreases within six miles of the site and studies suggest that the volcano's influence on the chemistry of rain is localized. However, this minimum level of impact is altered when the volcano is actively erupting. Vog has affected those with chronic respiratory or cardiovascular disease.

The spraying of agricultural chemicals is controlled within many divisions and branches of the State Department of Agriculture and the State Department of Health. Emissions from other private and municipal sources such as power generation facilities, are controlled through State and Federal regulations. Under the guidance of the Federal government, the State Department of Health continuously scrutinizes and updates the State's standards and regulations to address current issues, either meeting or exceeding Federal standards.

Water

The waters of the County are vulnerable to contamination. These include fresh, marine, and potable water. As population increases and further development occurs, there will be an increased demand for drinking and irrigation water. Recycled water is currently being used for erosion and dust control at lined land fills and there may be a need in the future to recycle sewage and waste water for use in irrigation. The major sources of water pollution are sewage, natural surface runoff, and the by-products of agricultural activities.

There are five municipal sewage systems with treatment plants that serve limited areas. As a result, only a small portion of the County's sewage is treated. Most sewage is disposed of in private cesspools, septic systems, or private wastewater treatment plants that must meet the State Department of Health's Water Quality Standards. The State Department of Health (DOH) intends to promulgate rules that will prohibit the installation of cesspools.

Since much of the volcanic soil of the island is highly permeable and underground lava tubes are widespread, seepage from cesspools have been known to contribute to the pollution of coastal waters and may pose a potential threat to underground sources of drinking water.

The State Department of Health is responsible for establishing, monitoring, and enforcing the Water Quality Standards. These standards are intended to protect the environmental quality of the waters of the island as well as to maintain the public health.

Soil

The soils of the County consist of various forms and stages of volcanic lava and ash. The young age and form of some of these soils make certain areas temporarily non-productive. Much of the volcanic soil is also highly permeable.

Soil pollution has occurred with the accumulation of industrial, agricultural, and domestic chemicals and the improper disposal of solid wastes, such as refuse, old cars, refrigerators, stoves and other scrap metal, thus creating both unsanitary and unsightly conditions.

There is no comprehensive program for the surveillance and monitoring of chemicals to be able to detect the rate and extent of accumulation within the soil. Little is known of their short- and long- term effects on the environment and public health.

Noise

Loud noises are known to have adverse physiological and psychological effects on people. Noise that is loud or out of character, especially from low flying aircraft, is critically disturbing to residents. Residential and resort areas near the Hilo International Airport are particularly affected. Noise levels will become increasingly more disturbing due to more jet service, vehicular traffic, construction, and the increasing size and density of urban areas. The Department of Health is responsible for establishing standards and regulations for noise control. State noise level regulations and standards are uniform throughout the State. The Federal Aviation Agency has established noise guidelines for determining compatible land uses surrounding airports, however the regulation of surrounding lands remain with the State and County.

Increased air transportation activity and changes in aeronautical technology, that could allow service by super-sonic aircraft could change the "noise contours" that affect lands surrounding the Kona International Airport at Keahole and Hilo International Airport. In order to eliminate the likelihood of surrounding land use development conflicting with future airport activity and/or expansion, appropriate easements and/or covenants should be required in conjunction with land use approvals for lands in the vicinity of the County's two major airports.

4.2 GOALS

- (a) Define the most desirable use of land within the County that achieves an ecological balance providing residents and visitors the quality of life and an environment in which the natural resources of the island are viable and sustainable.
- (b) Maintain and, if feasible, improve the existing environmental quality of the island.
- (c) Control pollution.

4.3 POLICIES

- (a) Take positive action to further maintain the quality of the environment.
- (b) Reinforce and strengthen established standards where it is necessary, principally by initiating, recommending, and adopting ordinances pertaining to the control of pollutants that affect the environment.
- (c) Advise the public of environmental conditions and research undertaken on the island's environment.
- (d) Encourage the concept of recycling agricultural, industrial, and municipal waste material.
- (e) Encourage the State to establish air and water quality monitoring stations in areas of existing and potential urban growth.
- (f) Encourage the State to continue aircraft noise abatement strategies at Hilo International Airport and the Kona International Airport at Keahole.
- (g) Participate in watershed management projects to improve stream and coastal water quality and encourage local communities to develop such projects.
- (h) Work with the appropriate agencies to adopt appropriate measures and provide incentives to control point and nonpoint sources of pollution.
- (i) Support programs to prevent harmful alien species from becoming established.
- (j) Require golf courses to implement best management practices to limit leaching of nutrients to groundwater in areas where they may affect streams or coastal ecosystems.
- (k) Require implementation of the management measures contained in Hawaii's Coastal Nonpoint Pollution Control Program as a condition of land use permitting.
- (l) Review the County grading and grubbing ordinances to ensure that they adequately address potential erosion and runoff problems.

4.4 STANDARDS

- (a) Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well being, through the enforcement of appropriate Federal, State and County standards.
- (b) Incorporate environmental quality controls either as standards in appropriate ordinances or as conditions of approval.
- (c) Federal and State environmental regulations shall be adhered to.

§4.4: Standards





FLOODING AND OTHER NATURAL HAZARDS

5.1 INTRODUCTION AND ANALYSIS

The problems of flooding in the County of Hawaii are attributed to ponding, surface runoff, high seas, storm surge, and tsunami inundation. Flood control is usually limited to confining runoff within natural or man-made watercourses and standing bodies of water. Drainage involves the collection and conveyance of runoff. The problems of high seas and tsunami inundation are generally alleviated by structural criteria, building setbacks, and land use restrictions.

The island is geologically very young and has not had a chance to develop defined watercourses in many areas. These poorly defined watercourses often overflow during rain storms. The South Kohala, North Kona, South Kona, Ka'u, Puna and South Hilo districts are particularly impacted by this problem.

On November 1, 2000, torrential rains struck East Hawaii. The National Weather Service reported approximately 27 inches of record rainfall at the Hilo International Airport within a 24-hour period. More than three feet of rain fell on some areas of the island, causing flooding in many areas of the County. The highest rainfall total was at Kapapala Ranch in Ka'u, where more than 36 inches was recorded within a 24-hour period. In Hilo, the Waiakea-Uka area was inundated with approximately 29 inches, the Piihonua area approximately 24 inches, Mountain View, nearly 29 inches, and Glenwood, 26 inches.

The record downfall overflowed streams and gullies, flooding roadways throughout downtown Hilo and isolating neighborhoods in some areas of the eastern side of the island. The districts of South Hilo, Puna and Ka'u were the hardest hit, with roads, bridges, power lines, businesses and homes either damaged or destroyed. In Hilo, a portion of Komoana Street was destroyed, and near Pahala, three bridges and portions of Highway 11 were washed away. During the height of the storm, various sections of Highway 11 were impassable. Most of the major storm damage on the highway occurred in the Puna and Ka'u Districts. Besides severe scouring of the roadway pavement, shoulders and drainage outlets and inlets in Mountain View, Glenwood, Volcano and Pahala, as well as bridges at the Makakupu ford crossing, Kaalaala Stream, Keiawa Stream and Paaau Stream, were damaged beyond economic repair. Portions of the highway from the 49 to 52 mile markers were closed for approximately three weeks. Farms suffered heavy damage to crops

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and massive erosion, telephone service was disrupted, and some residents experienced power failures for nearly 12 hours. Although no lives were lost as a direct result of the storm, flood damage was estimated at \$20,000,000. On November 9, 2000, a Federal disaster was declared for the island.

The coastline of the island is susceptible to high seas and tsunami inundation. Tsunamis may be of local or distant origination. Historically, those of distant origin have caused the most damage. However, of the nearly 305 miles of coastline, approximately 225 miles, or 75 per cent of the coastline is predominantly undeveloped cliff area and not subject to property damage from coastal flooding or tsunami inundation. Property damage from tsunami activity has occurred in Hilo-Waiakea, Laupahoe Point, Waipio Valley, Kawaihae-Puako, some portions of Napoopoo, Keauhou, and Kailua-Kona areas of the coastline. Low lying coastal areas of Ka'u and Puna have been devastated by tsunamis generated by local, large offshore earth movements. Since 1819, the island has experienced about twenty-three tsunamis with a run up of two meters (6.56 feet) or more. Due to the frequency of tsunami events and warnings, the Army Corps of Engineers initiated the planning for a tsunami protection system after the tsunami of April 1946. By a congressional resolution adopted in 1957 and the Rivers and Harbors Act of 1960, authorization was given to proceed on an offshore protection system that incorporated breakwaters and navigational improvements. However, further studies revealed that the high costs involved in the proposed tsunami barrier project made the project unfeasible. The project was subsequently abandoned. Warning procedures have been established to alert the public of the approach of a tsunami of distant origination. However, locally generated tsunamis give little or no warning for evacuation. An ongoing program to educate the public on tsunami hazards is needed.

Present drainage and flood problems are mainly due to the development of vacant lands, which are often subject to serious flooding without any commensurate, coordinated development of new drainage systems or expansion of the existing drainage systems. In many areas, the capabilities of existing drains, channels, and culverts have been exceeded during heavy rains. Additional problems occur when debris accumulates and clogs waterways. The absence of easements in drainage and flood courses also hinders maintenance.

Except for the metropolitan area of Hilo and portions of Kona and South Kohala, the majority of the existing flood and drainage systems were provided by the sugar plantations. In the past, each plantation town developed its own sewerage, water, and drainage systems. This policy of the plantations to "take care of one's own" has worked well in the past. However, government will need to take a more active role in providing flood control and erosion mitigation on all developed properties via the County's grubbing and grading ordinances and providing incentives to landowners and lessees to work with the United States Department of Agriculture's Natural Resources Conser-

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vation Service (NRCS) in developing and implementing soil and water conservation plans.

Since 1971, much progress has been made in alleviating flood and drainage problems and establishing flood plain regulation. The general plan for the development of a comprehensive drainage system is the "Drainage Master Plan for the County of Hawaii." This report, along with newer reports from the U.S. Army Corps of Engineers, the Natural Resources Conservation Service and the Federal Emergency Management Agency, has guided the flood control and drainage improvements made to date. The "Drainage Master Plan" should be revised and updated to include the new studies that have become available.

Technical and financial assistance from agencies outside of the County has been instrumental in the progress made in drainage and flood control in Hawaii County. The U.S. Army Corps of Engineers has provided studies identifying the problems, needs and extent of Federal participation in flood control measures in particular floodplains. Natural Resources Conservation Service has provided technical assistance in carrying out flood plain management studies. The Natural Resources Conservation Service, along with the Soil and Water Conservation Districts, also provides conservation programs to reduce and control surface water and sediment runoff for individual agricultural and conservation landholders. The continued assistance of these agencies is essential for further progress in flood control and drainage and erosion and sedimentation control in the County.

In 1982, the Federal Emergency Management Agency (FEMA) published the "Flood Insurance Study" for Hawaii County. This study investigates the existence and severity of flood hazards in Hawaii. The flood boundaries for streams, and the flood insurance zones and base flood elevation lines are delineated on the Flood Insurance Rate Maps (FIRM). These maps are the principal result of the "Flood Insurance Study," and have been incorporated into Hawaii County's Flood Plain Management Program.

Unfortunately, there have been problems with the use and accuracy of the Flood Insurance Rate Maps. It has been demonstrated that the current Flood Insurance Rate Maps are not very accurate as to the location, position, and formation of geographic and geologic attributes. Thus, it is sometimes difficult to determine if a parcel is on the Flood Insurance Rate Maps. Furthermore, there are many areas where there is no data to determine the flood potential. The absence of data does not mean an absence of potential flooding in any particular area. Therefore, there is an assumption that flood risk is minimal if a parcel is not in a designated Flood Insurance Rate Map area.

The State participates in drainage and flood control through the Department of Land and Natural Resources' Engineering Branch, Land Division. This agency is responsible for the implementation of a statewide flood control program, and providing techni-

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cal and financial assistance to the counties and the Soil and Water Conservation Districts.

Hawaii County exercises flood plain regulations because of the need for better coordination between the construction of properly planned drainage systems and urban development. The "Flood Insurance Study," identifying critical flood plain areas, coupled with the appropriate rules and regulations of the Federal Emergency Management Agency, has been incorporated into what is now Chapter 27 of the Hawaii County Code titled "Flood Control." This chapter serves to promote public health, safety, and general welfare, and minimize public and private losses due to flood conditions. Chapter 27, along with the flood control provisions within the subdivision, building, and grading codes, is the legal authority for Hawaii County's Flood Plain Management Program.

The Big Island experiences thousands of earthquakes each year, most undetectable, but some strong enough to be felt or causing minor damage. Most of the island's earthquakes are related to volcanic activity caused by magma moving beneath the earth's surface and concentrated beneath the island's two active volcanoes, Kilauea and Mauna Loa. Since 1868, there have been 14 earthquakes greater than magnitude six, most occurring on the south flank of Kilauea or Mauna Loa, including the Kaoiki region. Honomu, Hualalai and Kona also experienced earthquakes greater than 6.0 on the Richter scale.

With an estimated magnitude of 7.5 to 8.1, the largest Hawaiian earthquake in recorded history occurred in 1868 in the Ka'u district on the southeast flank of Mauna Loa. The 1868 earthquake caused islandwide damage, and the devastation was greatest in Ka'u, where an earthquake triggered mudflow and coastal subsidence produced a tsunami that destroyed several villages and killed 79 people.

In 1975, a magnitude 7.2 earthquake on Kilauea's south flank generated a tsunami that claimed two lives in the Hawaii Volcanoes National Park, destroyed homes in Punaluu, sank fishing boats in Keauhou Bay, and damaged boats and piers in Hilo. The most recent large earthquake of magnitude 6.1 occurred on Kilauea's south flank in June, 1989. Earthquakes with magnitude 5.5 and 6.6 have occurred approximately once every 10 years in the Kaoiki region, located between Kilauea and Mauna Loa. The most recent large earthquake with a magnitude 6.6 shook the region in 1983.

The island of Hawaii is sinking, or subsiding, at different rates for various reasons. Tide gauge data suggest that Hilo has sunk at a rate of 2.3 millimeters per year or approximately 4.5 inches in 50 years. At the same time, the sea level has risen about 1.8 millimeters per year, so Hilo has actually sunk about 8 inches relative to sea level in the 50-year period. Other studies suggest a slightly slower subsidence rate of 2.2 millimeters per year over 39,000 years. Hawaii is slowly sinking due to the great weight of the island that slowly bends the outer rigid layer of the earth. As the volcanoes

grow, their weight is greater than what the earth can support. Large earthquakes also produce coastal subsidence. The magnitude 7.2 Kalapana earthquake in 1975 produced coastal subsidence of approximately 10 to 11 feet near Halape, 3.5 inches at Kaena Point, 20 inches in Kalapana and nine inches in Kapoho. An earthquake related subsidence event such as this is equivalent to approximately 1,500 years of slow subsidence. Following the 1975 Kalapana earthquake, coastal areas near Kapoho continue to subside at a rate of approximately a few centimeters per year as the lower east rift zone near Kapoho slowly widens. Portion of Kapoho Vacationland Subdivision fronting the ocean are nearly completely submerged. Other areas of the island subject to earthquake-related subsidence are located between Palima Point and Naalehu, and Kealakekua Bay to south of Hookena.

The island is composed of five volcanoes, two of which – Kilauea and Mauna Loa – are expected to erupt frequently in the future. As such, the U.S. Geological Survey has identified lava hazard zones for the island. The U.S. Geological Survey Lava Flow Hazard Zone Map divides the island into Zones 1 through 9 based on the probability of coverage by lava flows. Zone 1 is the area of greatest hazard, and Zone 9 the least. Hazard zones from lava flows are based on the location and frequency of both historic and prehistoric eruptions. The zone boundaries are approximate, and the hazard posed by lava flows decreases as the distance from vents increases. Zone 1 includes the summits and rift zones of Mauna Loa and Kilauea where vents have repeatedly been active in historical times. More than 25 per cent of the area in Zone 1 has been covered by lava since 1800. Zone 2 includes the areas adjacent to and downslope of the most active parts of the rift zones. About 15-25 per cent of the area in Zone 2 has been covered by lava since 1800.

5.2 GOALS

- (a) Protect human life.
- (b) Prevent damage to man-made improvements.
- (c) Control pollution.
- (d) Prevent damage from inundation.
- (e) Reduce surface water and sediment runoff.
- (f) Maximize soil and water conservation.

5.3 POLICIES

- (a) Enact restrictive land use and building structure regulations in areas vulnerable to severe damage due to the impact of wave action. Only uses that cannot be located elsewhere due to public necessity and character, such as maritime activities and the necessary public facilities and utilities, shall be allowed in these areas.

§5.3: Policies

- (b) Review land use policy as it relates to flood plain, high surf, and tsunami hazard areas.
- (c) Update and improve the Flood Insurance Rate Maps and other flood maps in compliance with the National Flood Insurance Program (NFIP) as needed.
- (d) Any development within the Federal Emergency Management Agency designated flood plain must be in compliance with Chapter 27.
- (e) Promote and provide incentives for participation in the Soil and Water Conservation Districts' conservation programs for developments on agricultural and conservation lands.
- (f) The "Drainage Master Plan for the County of Hawaii" shall be reviewed and updated to incorporate new studies and reflect newly identified priorities.
- (g) Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works and in compliance with all State and Federal laws.
- (h) Develop a comprehensive program for the coordinated construction of a drainage network along a single drainage system.
- (i) Explore new methods of funding for the provision of adequate drainage systems and regulating potential flood inundation areas.
- (j) The County and the private sector shall be responsible for maintaining and improving existing drainage systems and constructing new drainage facilities.
- (k) Develop an integrated shoreline erosion management plan that ensures the preservation of sandy beaches and public access to and along the shoreline, and the protection of private and public property from flood hazards and wave damage.
- (l) Continue to promote public education programs on tsunami, hurricane, storm surge, and flood hazards.
- (m) Encourage grassed shoulder and swale roadway design where climate and grade are conducive.
- (n) Develop drainage master plans from a watershed perspective that considers non-structural alternatives, minimizes channelization, protects wetlands that serve drainage functions, coordinates the regulation of construction and agricultural operation, and encourages the establishment of floodplains as public green ways.
- (o) Encourage and provide incentives for agricultural operators to participate in Soil and Water Conservation District Programs.
- (p) Where applicable, natural drainage channels shall be improved to increase their capacity with special consideration for the practices of proper soil conservation, and grassland and forestry management.
- (q) Consider natural hazards in all land use planning and permitting.
- (r) Discourage intensive development in areas of high volcanic hazard.

5.4 STANDARDS

- (a) "Storm Drainage Standards," County of Hawaii, October, 1970, and as revised.
- (b) Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawaii County Code.
- (c) Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
- (d) Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawaii County Code.
- (e) Applicable standards and regulations of the Natural Resources Conservation Service and the Soil and Water Conservation Districts.

5.5 DISTRICTS

A general geographical description, a description of present flooding and drainage problems, and courses of action for the reduction of the flood and drainage problems are presented for the nine districts of the County.

5.5.1 Puna

5.5.1.1 Profile

The climate of the Puna District varies considerably from the rocky shoreline to the rain forest areas in the upper elevation. Rainfall amounts are generally heavy and most of the district receives over 100 inches per year.

The district is subject to heavy rainfall and there is record of severe flooding. Historically, flooding along the Belt Highway and the highway from Keaau to Pahoia had been the most prominent problems of the district. However, highway improvements have done much to alleviate the flooding on the roadways.

Currently, the lack of development and the extremely permeable soils have helped to minimize major flooding and damage to life and property. However, as the amount of development increases within the district, flood problems will also increase. Furthermore, the conversion of land historically planted in sugar to other crops may increase runoff. In this regard, Soil and Water Conservation District conservation programs can help lessen the potential problem.

Some of the flood hazard areas for the Puna district are difficult to delineate due to the lack of defined drainage ways. Recorded flood damage has mainly been caused by surface sheet flows that are likely to occur anywhere when heavy storms strike. Examples of this are found in Fern Forest, Eden Rock, Fern Acres, Orchidland, and Hawaiian Paradise Park. In addition to these subdivisions, flooding occurs in certain areas of Pahoia. Other areas, such as Hawaiian Acres, may be more defined. The

§5.5.2: South Hilo

flooding below Mt. View may be the result of diversion of the Mt. View watershed into some of the substandard subdivisions.

Systems that incorporate diversion channels to intercept sheet flows and main channels to transport the flows away or through the area have been proposed for the communities of Keaau and Pahoa. Along the Keaau-Pahoa Road, the State Department of Transportation (DOT) has installed culverts to facilitate the movement of water and minimize overtopping of the road in certain sections. In addition, the DOT plans to replace those culverts that are ineffective or inadequate.

Drainage systems incorporating the use of diversion channels to collect and transport surface flows safely through the area are also proposed for Mt. View. A portion of this system has been constructed.

The entire coastline is susceptible to tsunami impacts and hurricane storm surge inundation. However, much of the coastline is undeveloped and/or has high cliffs. This renders most developed areas outside of the inundation zone and not subject to damage. On November 29, 1975, an earthquake measuring 7.2 on the Richter Scale centered approximately three miles off shore of Halape generated a tsunami that killed two people and resulted in \$1,400,000 of property damage. The total damage of the earthquake and tsunami amounted to approximately \$4,100,000.

5.5.1.2 Courses of Action

- (a) As development increases within the district, the drainage systems designed for the existing village areas shall be implemented.
- (b) Conduct an update of the County of Hawaii "Drainage Master Plan" and the "Mountain View Drainage Study" and provide improvements as recommended by the updates.
- (c) Seek assistance to develop a comprehensive flood study for the subdivisions between and along Highways 11 and 130.
- (d) Ensure that purchasers of homes and other real property are fully informed of hazards from lava flows and other volcanic emissions.

5.5.2 South Hilo

5.5.2.1 Profile

With the Wailuku River as a dividing line, the South Hilo district can be separated into two watershed study areas. To the north of the river, the coastline has abrupt cliffs 30 to 80 feet high that are broken by deep stream channels. Usable land areas have a ground slope of six to twelve per cent. Above the 4,000 foot elevation, the stream channels diminish in number and depth and have all but disappeared above the 7,000 foot elevation. Flooding problems in this area are primarily caused by local water runoff from former sugar cane fields situated above the communities.

South of the Wailuku River is a relatively flat plain of less than one per cent slope that extends towards Highway 11. Above Highway 11, the slope steepens to approximately six to twelve per cent. Stream channels are poorly defined and disappear at elevations above 2,500 feet.

Waiakea

Until recently, the existing drainage system was the result of uncoordinated development. Lacking a comprehensive plan, property owners have constructed and installed drainage facilities to protect their own interests. In many instances, these facilities have seriously concentrated flows and aggravated situations downstream. Many proposals of the "Hilo Drainage and Flood Control Report" have been completed in the Waiakea area reducing the flooding problems.

Many culverts in upper Waiakea are inadequate. Roadside ditches, though small in cross-sectional area, are aided by the highly porous ground and are fairly effective even during heavy storms. One of the most serious problems faced by County maintenance crews is the frequent washout of cinder-gravel shoulders along road pavements. Another problem is the accumulation of vegetation growth and debris in waterways, which causes overflow.

The Waiakea Stream Preliminary Investigation report prepared by Natural Resources Conservation Service in November, 1999 identified the channel constrictions at the Hoaka, Kupulau, and Kawaiiani bridges as a major factor in the flooding of the Waiakea Stream Watershed. Several recommendations in the report suggests an increase in the level of maintenance for the Waiakea stream channel, reconstruction of the three bridges to handle the 100-year flood, installation of a flood levee above the properties along Kupulau Road, and Stream channel improvements to manage the volume of a 100-year flood.

In the lower Waiakea area, storm damage is minimal due to the effectiveness of the Wailoa and Waiakea-Uka Flood Control Projects.

The Waiakea coastal area is subject to tsunami and hurricane storm surge inundation and has suffered considerable loss to life and property from tsunami activity.

Kaumana-Ainako-Wailuku River

Kaumana's drainage system consists of roadside ditches, culverts, and narrow channels. Except for the Ainako Avenue area, all of upper Kaumana's storm water runoff is discharged either through the Waipahoehoe or the Alenaio Streams. The Chong Street Diversion No. 3 and the Wailuku-Alenaio Diversion No. 4 along Akolea Road serves to reduce flooding in the lower areas and the Ainako Avenue sections.

§5.5.2: South Hilo

The Wailuku-Alenaio Watershed Reinvestigation report prepared by Natural Resources Conservation Service in December, 1999 identified a new flood diversion alternative for the watershed. The alternative will control stormwater in Waipahoehoe and Kaluiiki Streams and could provide 100-year flood protection to communities on the south side of Kaumana Drive in the vicinity of Akolea Road and Chong Street. The County has requested the Natural Resources Conservation Service's assistance to further plan and implement the new alternative.

The drainage system in the Ainako-Wailuku River area is comprised of box culverts that pass the discharge of the Ainako River across Kokea, Koula, and Kapaa Streets. The residential areas bordering the Wailuku River have a system of collection ditches. Except during very intense storms, there are few problems in the area.

Hilo Urban Area

Between tsunamis and runoff from higher elevations, the commercial district has displayed amazing recuperative abilities. Prior to the completion of the Waiolama Canal in 1924 and the Ponahawai Storm Drain System in 1926, this area was a virtual "sea" during heavy rain. The construction of the canal and the storm drain system has since provided some degree of protection for the area.

The Alenaio Stream Flood Control Project, completed in 1998, begins just below Kapiolani Street and ends below Kilauea Avenue with an earthen levee leading into the Waiolama Canal. The project consists of three flood walls, a 1,790-foot rectangular concrete-lined channel, a 200-foot concrete entrance transition, and an 830-foot earthen levee. The project also included the reconstruction of four bridges located at Kapiolani, Ululani, Kinoole Streets, and Kilauea Avenue. The Alenaio Flood Control project mitigated much of the flooding that occurred in the Alenaio flood plain.

Except for the northern section of the business district, all of downtown Hilo falls within the Wailoa River basin and within the area tributary to the Alenaio Stream. The State Department of Transportation (DOT) has indicated that there are periodic shifts of beach material along the Hilo bay front shoreline. In addition, occasional storm events will close the roads at bay front due to storm surge. A study detailing the level of storm surge and the periodic shifts of beach material is needed before a solution can be developed.

The shoreline areas south of the Wailuku River are subject to damage from tsunami and hurricane storm surge inundation.

Paukaa, Papaikou, Pepeekeo, Honomu, Hakalau

These communities have no serious flood problems although Honomu and Papaikou have experienced minor flooding. These result from runoff from the areas above the communities.

Although the entire coastline is subject to tsunami activity, the majority of the area has high cliffs and is not subject to property damage.

5.5.2.2 Courses of Action

- (a) The "Hilo Drainage and Flood Control Report" by Wilson, Okamoto and Assoc., Ltd., January, 1967, shall be updated and implemented.
- (b) The "Hilo Area Comprehensive Study for Flood Damage Reduction" shall be updated and implemented.
- (c) The proposals of the "Final Report and Environmental Impact Study of Alenaio Stream" shall be implemented. Studies shall continue for the upper Alenaio Stream, the upper Wailuku River and its tributaries, the upper Waiakea Stream and Palai Stream.
- (d) The Hawaii County "Drainage Master Plan" for the Honomu, Pepeekeo, Papaikou, and Paukaa areas shall be updated and implemented. In addition, proper soil conservation measures shall be applied to reduce the amount of surface water and sediment runoff.
- (e) Assess the possibility of implementing the recommendations of the NCRS's "Waiakea Stream Preliminary Investigation" and the "Wailuku-Alenaio Watershed Reinvestigation" reports.
- (f) Encourage a study of storm surge and the annual change in shoreline beach movement as a solution to the closing of the bay front highway during storm events.

5.5.3 North Hilo

5.5.3.1 Profile

The district is characterized by an average ground slope of approximately 10 per cent with scores of deep intermittent and perennial streams.

Other than runoff from former cane lands, there is little record of flooding in urban areas. Each community is in close proximity to one or more gulches that carry flows from the upper watershed areas. The key to flood control within the district is to collect and divert surface runoff to the gulches. In addition, soil conservation practices are highly recommended.

The flood hazard areas are extremely difficult to delineate. High intensity storms can produce localized flooding in almost any area. The only definite flood hazard area is Laupahoehoe School.

The community of Ookala has not experienced heavy flooding although there are minor problems due to surface waters from the former cane fields above the town.

§5.5.4: Hamakua

There is no record of any flooding within the community of Ninole. The existing flood control system provided by the plantation is adequate.

The community of Laupahoehoe has not experienced any extreme flood flows. However, there will be a need to supply flood protection for the community since Laupahoehoe School, which is located just to the south of the urban center, has experienced some flooding. Water flows from the former cane fields, when the natural vegetation does not form a complete cover.

The community of Papaaloa has not experienced any serious flooding problems. With the projected expansion of the community, there will be a need to provide flood protection for the area.

The North Hilo district is characterized by high sea cliffs, most of which rise 300 feet above the sea. Except for the Laupahoehoe Point area, development is not subject to tsunami or hurricane storm surge damage.

5.5.3.2 Course of Action

- (a) The Hawaii County "Drainage Master Plan" for the Ookala and Laupahoehoe-Papaaloa areas shall be updated and implemented to alleviate problems of runoff from higher elevations.

5.5.4 Hamakua

5.5.4.1 Profile

The Hamakua District can be divided into two major watershed areas. The northern watershed, which affects the Waipio Valley area, extends upward into the Kohala Mountains. The second watershed extends to the peak of Mauna Kea and affects the communities of Kukuihaele, Honokaa, Paauhau, Paauilo, and Kukaiau.

The majority of the flood damage in this area is felt by the State or the County through damage to improvements within former cane fields, roads, ditches, and bridges.

Streams originating above and flowing through Honokaa have caused flooding in the town. The existing culverts within the town also do not have adequate capacity to handle volume flows.

The communities of Paauhau and Kukaiau have not been subject to any high flood flows in the past and the only recommended flood prevention measures would be the construction of diversion channels above the communities to divert water from former sugar cane fields and into the surrounding gulches.

Occasional flooding along the Hawaii Belt Road between Ahualoa and Waimea occurs when rainwater comes down from the pastures and overtops the road. Although

§5.5.5: North Kohala

there are no mitigation measures planned at this time, road improvements have alleviated some of the flooding and improved sheet flow.

Localized drainage problems exist within the limits of Paauilo. These problems are caused by allowing surface waters to collect from large areas within the town and flow down narrow roadways. The problems could be eliminated if this water was intercepted and transported to the gulches for disposal.

The only area that is subject to tsunami and hurricane storm surge inundation within the Hamakua district is Waipio Valley and three other uninhabited valleys to the north. Damage in Waipio Valley has been primarily to crops caused by periodic stream meandering, overflow, and stream blockages. Requested solutions and subsequent studies of the problem have found approaches to be economically unfeasible.

5.5.4.2 Courses of Action

- (a) The Hawaii County "Drainage Master Plan" for the Waipio-Kukuihaele, Honokaia-Paauhau, and Paauilo-Kukiaiu areas shall be updated and implemented.
- (b) Support the use of natural channels and proper soil conservation practices to manage flood control and drainage problems.
- (c) Implementation of proper flood control measures and soil conservation practices shall be used to minimize sheet flow, flooding, and sediment runoff from agricultural and forest reserve land above the communities of the district.
- (d) The Waipio Valley area shall be retained for limited recreational and agricultural activities due to its high susceptibility to flooding and tsunami inundation.
- (e) Encourage the State to develop mitigation measures for the occasional flooding along the Hawaii Belt Road between Ahualoa and Waimea.

5.5.5 North Kohala

5.5.5.1 Profile

The North Kohala district is subject to occasional heavy rainfall that creates heavy runoff. Streams collect water from the upper watershed and convey most flows safely through the urban centers. Although the gulches are generally smaller than those on the Hamakua coast, they have adequate capacity to handle storm flows.

Other than damage to highway culverts, there is no record of any flood damage to structures. There are areas, however, which are subject to flooding problems. These include the town of Hawi which has experienced surface sheet flows concentrating along the highway within the town, the highway and road culverts at Lipoa Gulch, and Halelua and Pueka gulches.

§5.5.6: South Kohala

The community of Kapaau has problems similar to those of Hawi. The existing highway culverts are inadequate to handle peak flood flows and have caused minor flooding problems in the past. On each side of the highway, the Makapala area is relatively flat and is susceptible to flooding by the Niulii and Waikani Streams.

The solution to the flood control and drainage problems of this district lies in the practice of proper soil conservation in agricultural lands and forest areas to help reduce and retard surface water and sediment runoff. In addition, there are the improvements to natural channels to increase their capacity.

The North Kohala district has recorded runoff from tsunami and hurricane storm surge activity. Areas subject to inundation include Pololu Valley, Upolu Point Airport, and the Mahukona Harbor areas.

5.5.5.2 Course of Action

- (a) The Hawaii County "Drainage Master Plan" for the Hawi and Honomakau-Kapaau areas shall be updated and implemented.

5.5.6 South Kohala

5.5.6.1 Profile

The South Kohala district can be divided into two separate watershed areas. The Waimea Village watershed extends into the Kohala Mountains. Heavy rainfall occurs in these mountains and several intermittent streams flow through the Waimea area. Upon reaching the Waimea plains, these streams turn to the west and flow toward Kawaihae across the extremely permeable lava flows of Mauna Kea. The Waikoloa stream has caused flooding within the town of Waimea during high intensity storms when waters overflow due to sharp stream bends and generally inadequate flow-carrying capacities. In addition, there is some flooding concern around the area abutting the Kawaihae road.

The second watershed area above the Kawaihae to Anaehoomalu shoreline extends from the coast to the peaks of Mauna Kea to Mauna Loa. The area is semi-arid with few well-defined channels and infrequent stream flows.

High intensity storms have caused flooding along the Queen Kaahumanu Highway from Kawaihae to Puako, and at Puako. These storms are very infrequent and tend to create flash floods. High flows have been experienced in the Hapuna Beach and Spencer Beach Park areas due to the flash floods. The Puako Beach lots have also been subject to flooding. During the evening of September 8, 1996, heavy rains generated a flash flood along Auwaiakeakua Stream. The floodwaters overtopped the existing drainage ways causing damage to private properties, particularly the Fairway Terrace Condominium at Waikoloa Village, County roads and drainage facilities.

§5.5.8: South Kona

Flood water and sediment damage occurs along the entire coffee belt with the Kainaliu, Holualoa and Kailua village areas experiencing the heaviest damage.

The entire coastline of the North Kona district is subject to inundation by tsunamis. Kailua and Keauhou have recorded run up and damage from tsunami activity in the past. In addition, the coastline has also been subject to damage from storm waves.

5.5.7.2 Courses of Action

- (a) Drainage systems for the Keopu/Hienaloli, Waiaha, Kaumalumu and the Holualoa/Horseshoe Bend drainageways shall be studied and remapped to determine the actions necessary to mitigate negative impacts.
- (b) Establish and maintain appropriate vegetative cover in high rainfall, sediment and debris producing areas.
- (c) Encourage the mapping of the floodways in North Kona to develop more effective flood control programs.
- (d) Encourage the use of natural drainageways as greenways in the development of the region.
- (e) Maintain and re-establish forest cover in mauka areas to improve the capacity of the ground to absorb heavy rainfall.

5.5.8 South Kona

5.5.8.1 Profile

Being geographically young, there are few well-defined drainage ways in the district. Overland and stream flows are rare and can only be detected when the rainfall intensity exceeds the rate of infiltration.

The district is subject to sudden high intensity rainstorms that can strike anywhere and cause localized flooding. Flood prone areas have been identified by the Natural Resources Conservation Service's "South Kona Flood Hazard Analyses."

Coffee and other agricultural lands are subject to erosional damage and roads and culverts are sometimes damaged by high flows and sediment deposition. The Sunset Coffee Mill Flood Prevention Project has provided substantial relief in the Napoopoo area.

There are also records of minor flooding from Kiilae, South Keokea, Honaunau and Wailapa Streams. In general, an area within 150 feet of the stream channels can be considered subject to flooding. Other areas with records of minor flooding include the areas along the Belt Highway in the area of the 1950 lava flows and at Hookena Road.

The entire shoreline is subject to inundation due to high seas and swells caused by hurricanes and distant storms. Coastal areas have received damage to roads, harbor facilities and oceanfront buildings. The shoreline areas are also subject to tsunami activity.

This includes the coastline from Napoopoo to Honaunau and the Milolii village area. Tsunami runup has been recorded in two locations along the South Kona shoreline, in Milolii and Hookena.

5.5.8.2 Courses of Action

- (a) The "South Kona Flood Hazard Analyses" for the Kealakekua, Napoopoo and Honaunau areas shall be updated and implemented.
- (b) Establish and maintain appropriate vegetative cover in high rainfall, sediment and debris producing areas.
- (c) Encourage the use of natural drainageways as greenways in the development of the region.
- (d) Maintain and re-establish forest cover in mauka areas to improve the capacity of the ground to absorb heavy rainfall.
- (e) Ensure that purchasers of homes and other real property are fully informed of hazards from lava flows and other volcanic emissions.

5.5.9 Ka'u

5.5.9.1 Profile

The Ka'u district can be divided into three separate regions. The northeastern region is dominated by the Ka'u desert. The average annual rainfall here is approximately 20 inches. There are few defined stream channels, none of which are perennial. The soils are very shallow, covering rough lava flows that are extremely permeable.

The southwestern region that extends westerly from the South Point Road is characterized by moderate slopes, extremely permeable soils, and relatively young lava flows. The median annual rainfall varies from less than 20 inches at South Point to 75 inches at the 5,000-foot elevation. There is little evidence of stream flow within this region and no record of damage from flood flows other than the flooding of roads within the Hawaiian Ocean View Estates subdivision.

The central region contains the communities of Pahala, Naalehu, and Waiohinu. There are several streams within the region, none of which are perennial. Flood flows occur when the soils are saturated and rainfall intensity exceeds the rate of infiltration. Storm runoff descends steep slopes behind the communities and causes flooding and deposition of sediment and debris in the communities.

There are three existing flood control measures in this district. A flood water channel and debris basin in Naalehu was completed in 1965 with additional improvements and modifications completed in 1969 and 1982.

§5.5.9: Ka'u

The second project is within the town of Pahala and consists of diversion channels in the former sugar cane fields above the town and the improvement of Paauau Stream.

The third project is within the town of Waiohinu. It is designed to collect flows from the watershed areas and transport them around Waiohinu for disposal in the rock land area. This project has been implemented, but needs additional improvements.

Although major flooding within the communities has been addressed, flash flooding along the Hawaii Belt Road still occurs. The Piikea, Keaiwa, Paauau, Punaluu, Hilea, Kawaa, and Honuapo streams often exceed the capacity of the existing bridges and culverts and flood the roadway. This temporarily closes the road and effectively cuts off this district from the Puna, Hilo and Kona districts.

However, in the Piikea ford area, the State DOT completed the construction of a new Piikea bridge in 1998. In addition to the bridge, improvements to the Piikea ford are proposed with the construction of three large box culverts. At the Paauau stream, there are plans for the construction of a new bridge. There are also plans for the replacement of the Ninole bridge located just past Punaluu. A new culvert is proposed in the Kawaa flats region.

The entire coastline of the district is subject to tsunami and high seas activity, with the Punaluu and Honuapo Bay areas having been severely damaged from past tsunami activity.

5.5.9.2 Courses of Action

- (a) Improve and upgrade existing flood control measures as necessary.
- (b) Continue proper soil conservation measures to complement the existing systems.
- (c) Investigate potential solutions to prevent the closure of the Hawaii Belt Road due to flooding.
- (d) Ensure that purchasers of homes and other real property are fully informed of hazards from lava flows and other volcanic emissions.



HISTORIC SITES

6.1 INTRODUCTION AND ANALYSIS

The heritage of a community is documented by its history. The physical evidence of such a documentation is often contained in archaeological and historic sites that support the written or traditional legacy.

The identity of a community evolves from the past. One way of understanding the present is through historic perspective, as cultural values are basically derived from past generations.

According to the State Department of Land and Natural Resources' Historic Preservation Division (SHPD), an estimated 11,500 archeological and historic sites have been identified on the island of Hawaii. However, only 5 per cent of the island has been surveyed. The other 95 per cent of the island contains an undeterminable number of historic and archeological sites. The abundance of historic sites can be attributed to the fact that much of the early history of the Hawaiian Islands had its setting on the Big Island. Archeological data indicates that Polynesian voyagers may have settled here as early as 600 A.D. Furthermore, significant historic figures such as King Kamehameha I conquered and ruled the Hawaiian Islands from the Big Island. The Historic Sites element also encompasses the recent past such as the coming of the various ethnic groups that have blended to create today's Hawaii.

There is continuing concern for the historic and archaeological sites of the County of Hawaii on the part of residents, governmental agencies, and private developers. As the early history of Hawaii was kept through oral tradition, the reconstruction of this period is largely based on the physical evidence and data recovered from archaeological and historic sites. It is realized that once destroyed, historic sites and the information they contain cannot be replaced. Many landowners are becoming aware that Hawaiian artifacts used in daily living are being removed from their lands for or by collectors. Consequently, sites have been despoiled and information regarding the function of the site itself and the artifacts have been destroyed.

The SHPD is charged with a variety of tasks within the State's historic preservation program. The SHPD maintains an inventory of known historic sites and promotes surveys to identify and document new sites. The SHPD also has a program element to place significant sites on the Hawaii Register of Historic Places and coordinates the nomination of sites to the National Register of Historic Places. SHPD also administers the Burial Sites

§6.2: Goals

Program. This program manages those burial sites that are over 50 years old. Approximately 98 per cent of the burial cases handled by the SHPD relate to native Hawaiian skeletal remains. Anyone who wishes to relocate, or preserve in place previously identified Hawaiian burials over 50 years old must obtain the approval of the appropriate Island Burial Council, that meets monthly on its respective islands. Any skeletal remains accidentally discovered must be reported to the SHPD and County police. If burial remains are estimated to be less than 50 years old, they fall under the jurisdiction of the police. Other programs, such as the Hawaiian Heritage Corridor Program, seek to preserve historic sites by enabling non-profit organizations in the various County districts preserve historic sites and buildings along a transportation corridor or the Department of Land and Natural Resources Ala Kahakai trail that will connect various historic sites and parks along the shoreline. Information regarding historic sites may be obtained by contacting the SHPD.

Archaeological investigations continue to be conducted on the island, adding to the list of known sites. These investigations, as well as cultural and historical research, are important in identifying significant cultural resources and helping to provide the basis for their protection and management. However, as indicated by the large number of estimated sites on the island, it is also important to establish criteria for determining what is significant.

The Public Access Shoreline Hawaii (PASH) decision of 1995 allows native Hawaiians the right to conduct their cultural traditions and practices upon lands where those activities had been conducted in the past.

6.2 GOALS

- (a) Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawaii.
- (b) Appropriate access to significant historic sites, buildings, and objects of public interest should be made available.
- (c) Enhance the understanding of man's place on the landscape by understanding the system of ahupuaa.

6.3 POLICIES

- (a) Agencies and organizations, either public or private, pursuing knowledge about historic sites should keep the public apprised of projects.
- (b) Amend appropriate ordinances to incorporate the stewardship and protection of historic sites, buildings and objects.
- (c) Require both public and private developers of land to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the

clearing or development of land when there are indications that the land under consideration has historical significance.

- (d) Public access to significant historic sites and objects shall be acquired, where appropriate.
- (e) Embark on a program of restoring significant historic sites on County lands. Assure the protection and restoration of sites on other public lands through a joint effort with the State.
- (f) Encourage the restoration of significant sites on private lands.
- (g) Collect and distribute historic sites information of public interest and keep an inventory of sites.
- (h) Aid in the development of a program of public education concerning historic sites.
- (i) Signs explaining historic sites, buildings and objects shall be in keeping with the character of the area or the cultural aspects of the feature.
- (j) Develop a continuing program to evaluate the significance of historic sites.
- (k) Develop policies to protect Hawaiian rights as identified under judicial decisions.
- (l) Support the establishment of Hawaiian Heritage Corridors.
- (m) All new historic sites placed on the State or Federal Register after the adoption of the general plan shall be included in the General Plan.
- (n) Consider requiring Cultural Assessments for certain developments as part of the rezoning process.
- (o) Recognize the importance of certain natural features in Hawaiian culture by incorporating the concept of “cultural landscapes” in land use planning.

6.4 STANDARDS

- (a) The evaluation of the importance of specific historic sites is necessary for future action. The following standards establish a framework for evaluating sites.
- (b) Importance in the life or activities of a major historic person.
- (c) Associated with a major group or organization in the history of the island or community.
- (d) Associated with a major historic event (cultural, economic, military, social, or political).
- (e) Associated with a major recurring event in the history of the community (such as annual celebrations).
- (f) Associated with a past or continuing institution that has contributed substantially to the life of the community.
- (g) Unique example of a particular style or period.
- (h) One of the few of its age remaining.

§6.5: Districts

- (i) Original materials and/or workmanship that can be valued in themselves.
- (j) Sites with a preponderance of original materials in context and complexes rather than single isolated sites unless they are of great significance.
- (k) Sites of traditional and cultural significance.

6.5 DISTRICTS

The following is a historical profile of the districts. The brief historical sketches of each district are intended to bring into focus the relationship of the district to the island as a whole. The list of sites that are included for the districts are those that have been officially placed on either the Hawaii Register or the National Register of Historic Places. It is important to understand that the listing of sites and their evaluation is an on-going process. Many other sites for the districts have been identified and may be equally significant but the process of evaluation and placement on a register has not been completed. New sites are constantly being discovered and these must be evaluated in conjunction with those already known.

6.5.1 Puna

6.5.1.1 Profile

Historically, the district of Puna did not have much political influence. However, Puna is closely associated with the volcano goddess Pele. For the most part, Puna followed the course of the adjacent districts of Ka'u and Hilo. No strong family lines evolved in the district for power over any of the other districts, and the lands of Puna almost always went to the ruler of Ka'u or Hilo.

The most significant historical feature known in Puna was the Waha'ula Heiau, located in Hawaii Volcanoes National Park. Unfortunately, it was destroyed in 1997 by the ongoing eruption of Kilauea. This was the first luakini heiau (temples presided over by the high chiefs) to be built by the priest Pa'ao, circa 1275 A.D., and the last in use until its destruction was ordered by Liholiho in 1820.

Table 6-1. Historic Sites, District of Puna

| Site | Tax Map Key | Ahupuaa or Region | Hawaii Register | National Register |
|--|----------------------|-------------------|-----------------|-------------------|
| Johnson Summer Home/Hale Ohia Cottages | 1-1-05:19, 42 | Keaau | x | |
| Hale Ohia Tract Historic District | 1-1-05: 24-26; 29-33 | Volcano | x | |
| Star of the Sea Catholic Church, Kalapana Painted Church | 1-2-06:81 | Kaimu | x | x |
| Ala Loa | 1-2-09:3 | Kehena | x | |



Table 6-1. Historic Sites, District of Puna (Continued)

| Site | Tax Map Key | Ahupuaa or Region | Hawaii Register | National Register |
|---|------------------------|-------------------|-----------------|-------------------|
| Keauohana Ahupua`a Archeological District | 1-2-09:3 | Kehena | x | |
| Opihikao Evangelical Church Residence | 1-3-04:18 | Opihikao | x | |
| King's Highway | 1-3-07:26 | Malama Ki | x | |
| MacKenzie Petroglyphs | 1-3-07:26, 1-3-08:1 | Malama Ki | x | |
| Mountain View Theater | 1-8-02:1 | Olaa | x | |

6.5.1.2 Course of Action

- (a) Support the establishment of Hawaiian Heritage Corridors.

6.5.2 North And South Hilo

6.5.2.1 Profile

In Hawaiian tradition, the district of Hilo played an important role. A cave behind Rainbow Falls was the home of Hina, the beautiful woman who bore the demigod Maui for the islands' traditional founder, Hawaii Loa. Pele herself shaped the area of Hilo by sending fingers of lava down the slopes of Mauna Loa. Kamehameha I spent part of his youth in the district and moved and overturned the Naha Stone, an omen of his later rise to power.

In 1778, the first written reports of Hilo were made by Captain James Cook, who said that heavy seas prevented his landing at "Aheedoo." One of the explorers who came after Capt. Cook was Lord Byron, who first charted Hilo Bay. For years, the bay was known as Byron's Bay and the entrance to the harbor, Blonde Reef, was named after his ship.

Following the explorers were fur traders and other seamen who found the islands an ideal location for wintering and obtaining provisions. By 1791 the exploitation of sandalwood began and Hilo's reputation as a port had emerged.

At the end of the sandalwood era, Christian missionaries arrived, led by William Ellis. In 1822, Ellis searched for a suitable location for a mission station. At the same time, Hilo was the starting point of pilgrimages to the volcano and a market place for people from Ka'u to Hamakua. The main settlement of Hilo was initially located at the mouth of the Wailoa River in Waiakea. Until the arrival of David Belden Lyman and Titus Coan in 1832, the mission's effect was not significant. By the end of 1837, however, two-thirds of the population of the area had relocated themselves to Hilo to join Coan's "Great Revival," leaving villages around Hilo deserted. When the mission eventually

§6.5.2: North And South Hilo

moved to the top of Haili Street from Waiakea, the new Christians followed. This established the present location of Hilo town.

Close to the end of Coan's revival, new explorers interested in commerce came to Hilo. The whaling industry had a great effect on the local population, luring Hawaiians away from home with a promise of adventure and money. The whaling industry declined after 1868 when petroleum was discovered in far-off Pennsylvania. The great tsunami and earthquake also occurred in this year.

The sugar industry began to develop in the early 1800's. However, it was not until the Reciprocity Treaty of 1875 with the United States that the industry firmly established itself. The treaty assured that no duty would be imposed on Hawaiian sugar imported into the United States. Thus, by the turn of the century, new sugar mills were established, labor was being imported from Asia and Europe, and Hilo became a thriving economic center. The present population reflects the various groups who have made their homes in the area.

Most historic sites of North and South Hilo have been either destroyed by agriculture, urban growth, and natural changes in landforms. Those sites that have been protected should remain as the area grows. Other sites, particularly historic buildings, should be the focus of these districts. These buildings, although not of ancient vintage, reflect the historic growth of the area.

Table 6-2. Historic Sites, Districts of North and South Hilo

| Site | Tax Map Key | Ahupuaa or Region | Hawaii Register | National Register |
|---|-------------|-------------------|-----------------|-------------------|
| Burials | 2-1-13:1 | Waiakea | x | |
| Burials | 2-1-13:1 | Waiakea | x | |
| Burials | 2-1-13:1 | Waiakea | x | |
| Burials | 2-1-13:1 | Waiakea | x | |
| Kamehameha Hall | 2-1-21:43 | Ponahawai | x | x |
| United Community Church | 2-2-20:2 | Ponahawai | x | |
| Volcano Block | 2-3-03:9 | Punahoa | x | x |
| United States Post Office and Office Building | 2-3-05:3 | Piihonua | | x |
| Hilo Masonic Lodge | 2-3-05:7 | Punahoa | x | x |
| District Court House and Police Station | 2-3-06:4 | Punahoa | x | x |
| Palace Theater | 2-3-07:21 | Punahoa | x | x |
| S. Hata Building | 2-3-08:16 | Punahoa | x | x |
| Michael Victor House | 2-3-14:2 | Punahoa | x | |
| W.H. Shipman House | 2-3-15:4, 5 | Piihonua | x | x |
| Rev. D.B. Lyman House | 2-3-16:24 | Punahoa | x | x |
| Ludloff Residence | 2-3-28:22 | Punahoa | x | |



Table 6-2. Historic Sites, Districts of North and South Hilo (Continued)

| Site | Tax Map Key | Ahupuaa or Region | Hawaii Register | National Register |
|--|-------------|-------------------|-----------------|-------------------|
| Masao Kubo Residence | 2-3-28:44 | Punahoa | x | |
| A.J. Williamson Residence | 2-6-06:11 | Kalalau | x | x |
| H. Tanimoto Residence (Honomu Theater) | 2-8-14:15 | Honomu | x | |
| Yamamoto Store | 2-9-03:18 | Wailea | x | |

6.5.2.2 Courses of Action

- (a) Support the development of Kalakaua Park and its surrounding area as the Kalakaua Park Heritage Area and the restoration of its historic significance to Hilo.
- (b) Identify historic sites within the South Hilo District for inclusion within the Hawaiian Heritage Corridor Program.

6.5.3 Hamakua

6.5.3.1 Profile

Most of the early history of the Hamakua district centers on Waipio Valley. The valley was settled early and was the home of several strong rulers as early as the 13th century. Among the chiefs of Waipio were Liloa and his son Umi. The traditions regarding Liloa indicates he was the first to rule over the entire island and his rule was one of peaceful diplomacy.

In 1823, the Rev. Ellis counted 265 houses in the valley and estimated the population at 1,325. The number of residents has declined steadily since Ellis' estimate. The same is true of the once populated Waimanu Valley.

Hawaiians also lived in the smaller valleys and gulches along the Hamakua coast and were known to cultivate taro.

In relatively recent historical times, there have been Asian and European influences in Hamakua, due primarily to the sugar industry. These influences have erased much of the physical evidence of the earlier culture, but have also introduced a different perspective on historic sites.

Table 6-3. Historic Sites, District of Hamakua

| Site | Tax Map Key | Ahupuaa or Region | Hawaii Register | National Register |
|--------------------------------|-------------|-------------------|-----------------|-------------------|
| East Hamakua Protestant Church | 4-4-06:1 | Keahua | x | |
| Pa`auhau Plantation House | 4-4-06:22 | Pa`auhau | x | |

Table 6-3. Historic Sites, District of Hamakua (Continued)

| Site | Tax Map Key | Ahupuaa or Region | Hawaii Register | National Register |
|--|-----------------|-------------------|-----------------|-------------------|
| Mauna Kea Adze Quarry | 4-4-15:1, 9, 10 | Kaohe | x | x |
| Chee Ying Society Clubhouse | 4-5-09:9 | Nienie | x | x |
| Honokaa Plantation Manager's Residence | 4-8-06:13 | Kanahonua | x | |

6.5.3.2 Course of Action

- (a) Coordinate with the community to identify historical sites and buildings for inclusion in a heritage corridor program.

6.5.4 North And South Kohala

6.5.4.1 Profile

Historically, the present districts of North and South Kohala were considered to be a single unit. Kohala is the birthplace of Kamehameha I. Mo'okini Heiau at Upolu Point is said to have been built by the priest Pa'ao in the 12th century. Other important historic events occurred in the district, particularly at Kawaihae. Kamehameha I gained complete control of the entire island after the death of chief Keoua of Ka`u at the Pu'ukohola Heiau.

It was at Kawaihae that John Young and Isaac Davis in the service of Kamehameha I cleared foreign arrivals who came to Hawaii. They persuaded Capt. George Vancouver to leave cattle in the area and Richard J. Cleveland to leave horses.

In 1820, the brig Thaddeus, carrying a group of Christian missionaries, made its first anchorage at the village of Kawaihae. John Young is credited with the decision to allow the missionaries to disembark at Kailua.

John Palmer Parker was influential in shaping the character of Kohala. He started ranching in Kawaihae and hunted the large number of cattle that had turned wild under the kapu or protection placed on them by Kamehameha I. Parker eventually moved to Waimea where he expanded his operation into what is today one of the oldest and largest privately owned ranches in the United States.

In 1832, the missionary Lorenzo Lyons arrived in Kawaihae. He established his station at Waimea and his parish included the districts of Kohala and Hamakua. Ten years later, Reverend Elias Bond took over the mission duties in North Kohala and established an excellent English school.

Although the character of Kohala has changed through history, the district's relative isolation has preserved many pre-contact sites. The leeward North Kohala coast still

§6.5.4: North And South Kohala

contains many remnants of coastal fishing villages that were occupied from the pre-historic period through the early 1900s. Likewise, remnants of the large agricultural complexes that supported the population are still found in both North and South Kohala. Mo'okini and Pu'ukohola Heiau still stand as monuments to the past, as do John Young's house site and the early Christian churches.

North Kohala

Table 6-4. Historic Sites, District of North Kohala

| Site | Tax Map Key | Ahupuaa or Region | Hawaii Register | National Register |
|---|---------------------------------|-------------------|-----------------|-------------------|
| Bond District | 5-3-05:4, 5, 17, 19, 20, 26, 27 | Iole | x | x |
| Tong Wo Society Building | 5-3-08:20 | Halawa | x | x |
| Kohala District Courthouse | 5-4-05:1 | Honopueo | x | x |
| Nanbu Hotel/Holy's Bakery | 5-4-05:22 | Honopue | x | |
| Union Mill Manager's Residence | 5-4-10:58, 59 | Puehuehu-Laaumama | x | |
| Mo'okini Heiau | 5-5-05:20 | Puuepa | x | x |
| Kohala Pilgrim Church | 5-5-15:25 | Pahoa | x | |
| James M. Hind Residence | 5-5-15:35 | Hawi | x | x |
| Hashimoto House | 5-5-15:38 | Hawi | x | |
| Hawi Plantation Manager's Residence | 5-5-15:41 | Hawi | x | |
| Heiau in Kukuipahu | 5-6-01:75 | Kukuipahu | x | x |
| Habitation Complex | 5-7-01:21 | Paoo | x | |
| Vault Complex | 5-7-01:21 | Paoo | x | |
| Makeanehu Complex | 5-8-01:12 | Makeanehu | x | |
| Habitation and Burial | 5-8-01:12 | Makeanehu | x | |
| Possible Heiau | 5-8-01:13 | Kehena | x | |
| Lapakahi Complex (District w/ multiple sites) | Various | Lapakahi | | x |

6.5.4.2 Courses of Action (North Kohala)

- (a) Coordinate with the communities and residents of North Kohala to identify historic sites and buildings for protection and preservation.
- (b) Encourage the preservation of historic buildings and promote new development, that matches the style of historic commercial buildings in the area.
- (c) Recognize the natural beauty and history of the area as a major economic and social asset to be protected and perpetuated as part of the uniqueness of the island.

South Kohala

Table 6-5. Historic Sites, District of South Kohala

| Site | Tax Map Key | Ahupuaa or Region | Hawaii Register | National Register |
|--|--|-------------------|-----------------|-------------------|
| Pu`ukohola Heiau National Historic Park (District w/ multiple sites) | 6-2-02:9, 10,16 | Kawaihae | | x |
| `Imiola | 6-5-04:4 | Waikoloa | x | x |
| Old Lindsey House | 6-5-06:42 | Lalamilo | x | |
| Ala Loa Foot Trail (Southernmost Kohala and Northernmost Kona Districts) | Portions of 6-8-01:32, 35;6-8-22:32;6-9-01:15;6-9-07;7-1-03:22 | Various | x | |
| Kiholo-Puako Trail | Various | Various | x | x |
| Puako Petroglyph Archeological District | 6-9-01:15 | Lalamilo | x | x |

6.5.4.3 Course of Action (South Kohala)

- (a) Support the establishment of Hawaiian Heritage Corridors.

6.5.5 North And South Kona

6.5.5.1 Profile

The Kona districts have been very significant in the history of Hawaii. Before the arrival of Captain Cook, a large population was settled in villages along the coast. Various rulers lived in the area and have left evidence of the complex religious, social, and political systems that evolved in Hawaii. In North Kona, the major complexes are located at Kailua, Holualoa, and Kahaluu. In South Kona, they are located at Kealakekua and Honaunau.

When Captain Cook arrived at Kealakekua Bay in January 1779, he reported that the area was flourishing. It is well known that he was accepted as the god Lono and visited heiau and village sites at Napoopoo. Following Captain Cook's death, no foreign ships stopped in Kona for several years. In 1792, Captain George Vancouver arrived in Kona and left orange trees, grapevines, other plants, and cattle for King Kamehameha I and his chiefs.

In 1812, Kamehameha I established his permanent residence and capital in Kailua-Kona. The royal family remained in Kona until the capital was moved to Honolulu. The districts prospered during the sandalwood and whaling eras, with Kealakekua serving as the main port. In 1820, the first missionary station on the island was established in Kailua.

§6.5.5: North And South Kona

Although Kona has experienced rapid change since Captain Cook's arrival, it still contains many undisturbed historical sites. Most of these sites are of traditionally Hawaiian origin and can reveal information important in reconstructing Hawaii's early history.

North Kona

Table 6-6. Historic Sites, District of North Kona

| Site | Tax Map Key | Ahupuaa or Region | Hawaii Register | National Register |
|--|------------------------------------|-------------------|-----------------|-------------------|
| Francis Ii Brown Beach Residence | 7-1-03:3, 12, 13 | Puuanahulu | x | x |
| Bobcat Trail Habitation Cave | 7-1-04:6 | Puuanahulu | | x |
| Shelter and Pen | 7-3-43:3 | Ooma | x | |
| Wawalo'i Habitation | 7-3-43:3 | Ooma | x | |
| Habitation Cluster | 7-3-43:3 | Ooma | x | |
| Kalaoa Permanent House Site 10,205 | Portion of 7-3-43:42 | Ooma | x | x |
| Honokohau Settlement/Kaloko-Honokohau National Historic Park | 7-3-09:2; 7-4-08:3, 10, 25 | Kaloko, Honokohau | | x |
| Haleokane Heiau | 7-4-08:3 | Kealakehe | x | |
| Habitation Site | 7-4-08:3 | Kealakehe | x | |
| Lanihau Papamu | 7-5-05:7 | Lanihau | x | |
| House and Burials | 7-5-05:7 | Lanihau | x | |
| Kamakahonu (Residence of King Kamehameha I) | 7-5-06:24, 32 | Lanihau | x | x |
| Moku'aikaua Church | 7-5-07:18 | Keopu | x | x |
| Hulihe'e Palace | 7-5-07:20 | Keopu | x | x |
| Pua'a 2 Agricultural Fields Archeological District | Portion of 7-5-14:23 | Puaa | x | x |
| Hale Halawai o Holualoa | 7-6-16:13 | Holualoa | x | x |
| Keolonahihi Complex/Kamoa Point Complex (District w/ multiple sites) | 7-7-04:12, 28, 31, 51, 52, various | Holualoa | x | x |
| Ahu-a`Umi Heiau | 7-8-01:3 | Keauhou | | x |
| Kahaluu Historic District (District w/ multiple sites) | 7-8-10:2, 4, 35 | Kahaluu | | x |
| Keauhou Holua Slide | 7-8-10:30 | Keauhou | | x |
| Kuamo`o Burials | 7-8-10:66 | Keauhou | | x |
| Kamehameha III Birthplace (Kauikeaouli Stone) | 7-8-12:17 | Keauhou | x | x |

6.5.5.2 Course of Action (North Kona)

- (a) Establish suitable visual buffers for the Keakealaniwahine and Keolanahihi complexes as a condition of rezoning or Special Management Area permits, for nearby properties.

South Kona

Table 6-7. Historic Sites, District of South Kona

| Site | Tax Map Key | Ahupuaa or Region | Hawaii Register | National Register |
|--|--------------------------|-------------------|-----------------|-------------------|
| Greenwell Store | 8-1-04:50 | Onouli | x | x |
| Christ Church Episcopal | 8-1-05: 8 | Kealakekua | x | |
| Kahikolu Church | 8-2-07:6 | Kahauloa | x | x |
| Daifukuji Soto Zen Mission | 8-2-10:20 | Kalamaumi | x | x |
| Uchida Coffee Farm | Portion of 8-2-15:13 | Kaawalo | x | x |
| Kealakekua Bay Historical District (District w/ multiple sites) | 8-2 Various; 8-3 Various | Various | | x |
| Saint Benedict's Catholic Church | 8-4-06:6 | Honaunau | x | x |
| Pu`uhonua o Honaunau National Historical Park (District w/ multiple sites) | 8-4-11:7 | Honaunau, Keokea | | x |
| Burial Cave | 8-9-03:1 | Honomalino | x | |
| North Honomalino Complex | 8-9-03:1 | Honomalino | x | |
| Okoe Bay Complex | 8-9-03:1 | Kaulana, Mauna | x | |
| Kaulanamaluna Upland Complex | 8-9-06:2 | Kaulanamaluna | x | |
| Ahole Holua Complex | 8-9-06:3 | Kapua | | x |

6.5.5.3 Courses of Action (South Kona)

- (a) Support the establishment of Hawaiian Heritage Corridors.
- (b) Adopt the Heritage Corridor Plan, which includes lands from Holualoa to Honanau.
- (c) Establish buffers on undeveloped lands around Kealakekua Bay to assure preservation of the region's unique environment and cultural resources.

6.5.6 Ka'u

6.5.6.1 Profile

The district of Ka'u has historically been a relatively independent district, isolated from the rest of the island. Historical data indicates that Ka'u was probably settled very early by the Polynesian voyagers. As population increased, the rest of the island was inhabited. Most of the early settlement in Ka'u consisted of small fishing villages.

In 1791, Kamehameha I became ruler of the entire island after the death of Keoua, the chief of Ka`u at the dedication of Pu'ukohola Heiau at Kawaihae.

Ka'u later became the stopping point for seagoing travelers on their way to Hilo. In the 1860's, Mark Twain lived in Waiohinu and wrote extensively about his stay in Ka'u. While living in Waiohinu he declared Hawaii to be "the loveliest fleet of islands."

Table 6-8. Historic Sites, District of Ka'u

| Site | Tax Map Key | Ahupuaa or Region | Hawaii Register | National Register |
|----------------------------------|---------------------|--------------------------------|-----------------|-------------------|
| Manuka Bay Petroglyphs | 9-1-01:3 | Manuka | x | x |
| Platform and Mounds | 9-1-01:3 | Manuka | x | |
| Kuleana Complex | 9-1-01:3 | Manuka | x | |
| Koa | 9-1-01:3 | Manuka | x | |
| South Manuka Bay Complex | 9-1-01:3 | Manuka | x | |
| Platform and Shelters | 9-1-01:3 | Manuka | x | |
| Lava Tube Complex | 9-1-01:3 | Manuka | x | |
| Kaiakekua Complex | 9-1-01:3 | Manuka | x | |
| Keawaiki Complex | 9-1-01:3 | Kaupua`a | x | |
| Manuka Bay Holua Slide | 9-1-01:3 | Manuka | x | |
| Heiau and Trail | 9-1-01:3 | Manuka | x | |
| Kipuka Malua Complex | 9-1-01:3, 6 | Manuka | x | |
| Shrine and Heiau | 9-1-01:3, 7 | Manuka | x | |
| Habitation Complex | 9-1-01:7 | Manuka | x | |
| South Point Complex | 9-3-01:1, 3, 7, 11 | Kamaoa | | x |
| Mahana Archeological District | Portion of 9-3-01:2 | Kamaoa | x | |
| Kapalaoa Archeological District | Portion of 9-3-01:2 | Kamaoa | x | |
| Ki`i Petroglyphs | 9-5-06:1 | Waiohinu | x | x |
| Kilauea Crater | 9-9-01:1 | Hawaii Volcanoes National Park | | x |
| 1790 Footprints | 9-9-01:1, 2 | Kapapala Forest Reserve | | x |
| `Ainapo Trail (Menzies Trail) | 9-9-01:3 | Hawaii Volcanoes National Park | | x |
| Wilkes Campsite | 9-9-01:3 | Hawaii Volcanoes National Park | | x |
| Ainahou Ranch House | 9-9-01:6 | Hawaii Volcanoes National Park | x | x |
| Whitney Seismograph Vault No. 29 | 9-9-01:23 | Hawaii Volcanoes National Park | | x |
| Old Volcano House No. 42 | 9-9-01:23 | Hawaii Volcanoes National Park | | x |

§6.5.6: Ka'u

Table 6-8. Historic Sites, District of Ka'u (Continued)

| Site | Tax Map Key | Ahupuaa or Region | Hawaii Register | National Register |
|--|-------------|-------------------|-----------------|-------------------|
| Mauna Loa Trail | Various | Various | | x |
| Puna-Ka`u Historic District, Hawaii Volcanoes National Park (District w/ multiple sites) | Various | Various | | x |

6.5.6.2 Course of Action

- (a) Support the establishment of Hawaiian Heritage Corridors.



NATURAL BEAUTY

7.1 INTRODUCTION AND ANALYSIS

The natural beauty of Hawaii is a universally recognized characteristic and one of the most significant and valuable assets of this island. In a relatively small area exists a great range of environments, from lush green tropical valleys to snow-capped mountains.

Hawaii's natural and scenic beauty is the result of the interaction of various physical elements and forces. Three primary factors contribute to the variety of environments: elevation, relative location, and geologic origin and age. A further factor is modification by man. The types of landform and vegetation depend on these basic factors. Due to different elevations and locations of the island, the landscape features have particular characteristics. These include barren fields of lava, heavily vegetated valleys, kiawe deserts, native forests, rolling grasslands, and rocky coastlines. The differences in the environment and the landscape features are important in giving identity to areas of the island and enhances the livability of the island by providing a preference of physical settings.

Natural beauty is a multifaceted resource. It is an aesthetic resource experienced by human perceptions. It is an economic resource, as evidenced by the scale of resort development and by visitor-related activities. Real property values further substantiate the economic value of Hawaii's dramatic beauty. The physical elements that make up the landscape and the interrelationships of these elements are also of scientific interest. Investigating and understanding the physical environment are necessary for man to live in harmony with the environment.

As the population increases, the desire to experience natural beauty will continue and may increase. If uncontrolled, the development necessary to accommodate an increasing population as well as resort development could have detrimental effects on the natural beauty of the island. Areas with special amenities of natural beauty have been and will continue to be the focus of pressure for resort development. Present regulatory process provide an assessment of impacts of development projects in order to protect, preserve and restore natural and scenic resources.

Hawaii's natural beauty is both an irreplaceable asset and a part of the public trust. It is fragile and although often enhanced by man can easily be adversely affected. Measures must be taken to insure its protection, both now and in the future, for the enjoyment of Hawaii's residents and visitors.

§7.2: Goals

Through the Zoning and Subdivision codes, and the Special Management Area and shoreline setback regulations, the County of Hawaii has the means to protect the island's natural and scenic beauty as an integral part of the living environment of the island. Safeguards of this valuable asset are a major consideration for any construction or development that may alter, eliminate, or intrude upon it. They are also important so that man-made elements are kept in an aesthetic perspective with the physical surroundings.

The County Arborist Advisory Committee was established to determine guidelines to identify the physical and botanical importance of trees and tree masses on the island. Criteria such as the aesthetic quality, rarity, cultural significance and endemic status are evaluated in designating exceptional trees or tree masses. Preservation for those selected are enacted by County ordinance or regulation.

The Hawaii County Planning Department adopted Rule 17 that implements landscaping requirements. The purpose of the rule is to use landscaping requirements to create screens and buffers from noise, lights, and litter; moderate the visual impact and microclimates of paved parking lots and parked vehicles; enhance the street scape of commercial and industrial areas; and promote ecological and cultural values through landscaping with native and other appropriate plants.

The importance of natural and scenic beauty and its true evaluation as an asset of public trust to be protected for future generations remain with the people of this island. While public planning and regulation are instrumental in achieving the goals set forth for this element, it is public awareness and interest that will maintain the natural beauty of the island of Hawaii.

7.2 GOALS

- (a) Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.
- (b) Protect scenic vistas and view planes from becoming obstructed.
- (c) Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.

7.3 POLICIES

- (a) Increase public pedestrian access opportunities to scenic places and vistas.
- (b) Develop and establish view plane regulations to preserve and enhance views of scenic or prominent landscapes from specific locations, and coastal aesthetic values.
- (c) Maintain a continuing program to identify, acquire and develop viewing sites on the island.

- (d) Access easement to public or private lands that have natural or scenic value shall be provided or acquired for the public.
- (e) Develop standard criteria for natural and scenic beauty as part of design plans.
- (f) Consider structural setback from major thoroughfares and highways and establish development and design guidelines to protect important viewplanes.
- (g) Maintain a continuing program to identify exceptional trees or tree masses.
- (h) Protect the views of areas endowed with natural beauty by carefully considering the effects of proposed construction during all land use reviews.
- (i) Do not allow incompatible construction in areas of natural beauty.

7.4 STANDARDS

The following standards provide guidelines for designating sites and vistas of extraordinary natural beauty that shall be protected.

- (a) Distinctive and identifiable landforms distinguished as landmarks, e.g. Mauna Kea, Waipio Valley.
- (b) Coastline areas of striking contrast , e.g. Laupahoehoe Point.
- (c) Vistas of distinctive features.
- (d) Natural or native vegetation attractive to a particular area.
- (e) Areas that are harmoniously developed and enhanced by man to appear natural.

7.5 DISTRICTS

The following describes the characteristic natural and scenic beauty of the districts of the County of Hawaii. Examples of sites and vistas are listed. The goals, policies, and standards of the element shall set forth the courses of action for sites and vistas of natural beauty.

7.5.1 Puna

Along the coast of Puna district the black sand beaches and tidal ponds are noted features of natural beauty.

The inland areas of Puna are lava land. Major areas of natural beauty are the 1960 Kapoho and the Pu'u O'o volcanic regions. The region is significant in that it represents the force of nature in altering the landscape feature into a cone and desolate field of lava.

A portion of the Hawaii Volcanoes National Park is also located within this district.

§7.5.1: Puna

The following list of sites are examples of natural beauty in the Puna district.

Table 7-1. Natural Beauty Sites, District of Puna

| Site | Tax Map Key | Ahupuaa or Region |
|---|--------------------------|--------------------|
| Viewplane from Paho-Kalapana Highway looking makai | 1-2-04, 06, 07, 09 | |
| Kehena Black Sand Beach | 1-2-09:21 | Kehena |
| Viewpoint-Shoreline | 1-2-09:22 | Kekeekee |
| 1955 Lava Flow (Iilewa Cone) | 1-2-10:1 | Kamaili |
| Ironwood Groves along Kapoho-Kalapana Road | 1-3-03:5 & 1-3-07:6 & 26 | Kauaea; Malama-Ki |
| Viewpoint-Shoreline | 1-3-04:71 | Opihikao |
| MacKenzie Park | 1-3-07:26 | Malama-Ki |
| Mango Grove along Pohoiki Road | 1-3-08:4 & 5 | Pohoiki |
| Keahialaka Spring & Pond | 1-3-08:15 | Keahialaka |
| Shoreline | 1-3-08:15 | Keahialaka |
| Warm Springs | 1-3-08:34 | Pohoiki |
| Albizzia Grove along Paho-Kapoho Road | 1-4-01:4 | Kaniahiku |
| 1960 Lava Flow | 1-4-02:1 | Kapoho |
| Kapoho Tidal Ponds | 1-4-02 | Kapoho |
| Viewpoint (Puu Kukae) | 1-4-02:2 | Kapoho |
| Kapela Bay (Black Sand Beach) | 1-4-03:13 | Kahuwai |
| Viewpoint-Shoreline (Hilo & Puna) | 1-4-03:13 | Kahuwai |
| Viewpoint & Tidal pool (Makaukiu Pt.) | 1-4-03:13 | Kahuwai |
| Ironwood Grove at Nanawale Park | 1-4-03:18 | Nanawale |
| Viewpoint-Shoreline (Honolulu Landing) | 1-4-03:19 | Honolulu |
| Mango Grove along Kapoho-Honolulu Landing Road | 1-4-03 & 04 | Kahuwai & Halepuua |
| View from Green Lake Hill | 1-4-91:18 | Kapoho |
| Viewpoint-Shoreline | 1-5-63:1-4 | Waiakahuila |
| Cove with Stone Beach | 1-6-01:25 | Keaau |
| Royal Palms fronting Keaau Intermediate School | 1-6-02 | Keaau |
| View of Mauna Kea and Mauna Loa from Paho-Keaau, Volcano-Keaau Roads, and various Puna subdivisions | Various | Various |
| Pu'u O'o Lava Flow Region | Various | Various |



The following designated exceptional trees are adopted by ordinance.

Table 7-2. Exceptional Tree, District of Puna

| Tree | Tax Map Key |
|---------------------------------|-------------|
| Grove of Mangoes (Pohoiki Road) | 1-3-08 |

7.5.2 South Hilo

The natural beauty of the South Hilo district is dominated by Mauna Kea and Mauna Loa. From various locations in the area, there are magnificent views of the mountains. Hilo Bay provides a picturesque front yard for Hilo. From the bay the land gently slopes upward towards Mauna Kea and Mauna Loa.

Throughout the district there are waterfalls, including the famous Akaka Falls and nearby Kahuna Falls, Rainbow Falls, and others.

The following list of sites are examples of natural beauty in the South Hilo district.

Table 7-3. Natural Beauty Sites, District of South Hilo

| Site | Tax Map Key | Ahupuaa or Region |
|---|----------------|-------------------|
| Banyan Drive Scenic Area | 2-1-01, 03, 05 | Waiakea |
| Liliuokalani Gardens | 2-1-03:2 | Waiakea |
| Viewpoint of Hilo Bay area with Mauna Kea in Background | 2-1-03:2 | Waiakea |
| Viewpoint of Hilo Bay with Mauna Kea in Background | 2-1-03:17 | Waiakea |
| Coconut Isle (Mokuola) | 2-1-03:19 | Waiakea |
| Reeds Bay (Shoreline) | 2-1-05:1 | Waiakea |
| Ice Pond | 2-1-06:10 | Waiakea |
| Viewpoint-Shoreline (Lelewi Point) | 2-1-11:5 | Waiakea |
| Lehia Park (undeveloped) | 2-1-13:5 | Waiakea |
| Viewpoint-Shoreline (Keokea Point) | 2-1-14:13 | Waiakea |
| Lihikai (Onekahakaha) Beach Park shoreline | 2-1-14:13 | Waiakea |
| Waiahole Fish Pond | 2-1-15:1 | Waiakea |
| Haleolono Fish Pond | 2-1-15:42 | Waiakea |
| Lelewi Park shoreline | 2-1-16 to 19 | Waiakea |
| Lokoaka Pond, Akahi Pond, and Kionakapahu Pond | 2-1-16:1 | Waiakea |

§7.5.2: South Hilo

Table 7-3. Natural Beauty Sites, District of South Hilo (Continued)

| Site | Tax Map Key | Ahupuaa or Region |
|--|-------------------------------------|-------------------|
| Viewpoint-Shoreline (Waiuli Point) | 2-1-19:9 | Waiakea |
| Wailoa River Area: --Hoakimau Fish Pond; --Mohouli Fish Pond; --Waiakea Fish Pond | 2-2-13:3; 2-2-29:27; 2-2-31:1 | Waiakea |
| Puu Halai | 2-3-22 | Ponahawai |
| Rainbow Falls and Area (Wailuku River Park) | 2-3-27:1, 2 | Piihonua |
| Kaimukanaka Falls and Area | 2-3-27:3, 5 | Piihonua |
| Boiling Pots and Area | 2-3-29:12 | Piihonua |
| Viewpoint on hilltop looking over Hilo Bay | 2-3-37 | Ponahawai |
| Waiole Falls and Area | 2-5-9:4 | Piihonua |
| Peepee Falls and Area | 2-5-10:1 | Piihonua |
| Viewpoint from lower Wailuku Bridge looking makai | 2-6-02 | Piihonua |
| Viewpoint from lower Wailuku Bridge looking mauka | 2-6-03 | Piihonua |
| Alealea Point looking towards Hilo Bay | 2-6-15:1 | Wailua |
| Keakanini Falls | 2-6-18:4 | Piihonua |
| Hawaii Falls | 2-6-18:4 | Piihonua |
| Honolii Beach Area and Stream | 2-6-24:1-4 | Alae |
| Onomea Bay Area | 2-7-09:1, 2, 26; 2-7-10:1 | Kahalii-Onomea |
| Onomea Arch (fallen) | 2-7-10:1 | Onomea |
| Akaka and Kahuna Falls | 2-8-10:34 | Honomu |
| Kolekole Gulch | 2-8-15, 2-9-03 | Kuhua-Kaiwiki |
| Hakalau Bay/Gulch Area | 2-9-02, 3-1-01 | Hakalaunui-Kamae |

The following designated exceptional trees are adopted by ordinance.

Table 7-4. Exceptional Trees, District of South Hilo

| Tree | Tax Map Key |
|---|-------------|
| Monkeypod (Suisan Fish Market) | 2-1-03:27 |
| Coconut trees (Waiolama Canal) | 2-2-04:2 |
| Grove of Monkey Pod Trees (Kamehameha and Pauahi Streets) | 2-2-04:35 |



Table 7-4. Exceptional Trees, District of South Hilo (Continued)

| Tree | Tax Map Key |
|---|-------------|
| Grove of Monkey Pod Trees (Kamehameha and Pauahi Streets) | 2-2-04:56 |
| Gold tree (Forestry Arboreteum) | 2-2-07:1 |
| Chinese Weeping Banyan (Kilauea Ave.) | 2-2-28:8 |
| Indian Banyan (Kalakaua Park) | 2-3-05:1 |
| Quinine (Kalakaua Park) | 2-3-05:1 |
| Divi-Divi (Kalakaua Park) | 2-3-05:1 |
| Loulu Palm (Kalakaua Park) | 2-3-05:1 |
| False Kamani (Haili Street Church) | 2-3-12:9 |
| Surinam Cherry (Hilo United Methodist Church) | 2-3-14:7 |
| Bo or Peepul Tree (Old Riverside School) | 2-3-15:1 |
| Ohia Lehua (Rainbow Falls) | 2-3-27:1 |

7.5.3 North Hilo

One of the most outstanding areas of natural beauty in North Hilo is Laupahoehoe Point. The point juts out calmly, ending in a rugged coastline with pounding surf. In either direction along the coast are views of the high cliffs.

The deep gulches with silvery green Kukui trees contrasting with the darker green vegetation along the highway are also points of natural beauty, particularly Honohina Falls in Nanue Gulch.

The following list of sites are examples of natural beauty in the North Hilo district.

Table 7-5. Natural Beauty Sites, District of North Hilo

| Site | Tax Map Key | Ahupuaa or Region |
|--|------------------|-------------------|
| View point of Umauma Gulch (makai from bridge) | 3-1-01:1, 24 | Wailua |
| Viewpoint of Falls in Umauma Gulch (mauka from bridge) | 3-1-01:23, 30 | Wailua |
| Nanue Gulch-Makai | 3-2-01:1, 8 | Nanue |
| Honohina Falls (Nanue Gulch and stream) | 3-2-01:11, 17 | Nanue |
| Maulua Gulch | 3-4-04:9, 11, 12 | Maulua Iki |
| Kaiwilahilahi Gulch | 3-5-03 | Kaiwilahilahi |
| Manawaiopae Gulch | 3-5-04 | Manawaiopae |
| Kihalani Gulch | 3-5-04 | Kihalani |

§7.5.4: Hamakua

Table 7-5. Natural Beauty Sites, District of North Hilo (Continued)

| Site | Tax Map Key | Ahupuaa or Region |
|--------------------------------|-------------------|--------------------|
| Kuwaikahi Gulch | 3-5-04 | Kihalani |
| Kilau Gulch | 3-6-01 | Laupahoehoe |
| Scenic Lookout-Laupahoehoe Pt. | 3-6-01:9 | Alaea |
| Laupahoehoe Gulch | 3-6-04 | Laupahoehoe |
| Kaawalii Gulch | 3-6-05, 3-9-01 | Waipunalei-Humuula |

The following designated exceptional trees are adopted by ordinance.

Table 7-6. Exceptional Tree, District of North Hilo

| Tree | Tax Map Key |
|---|-------------|
| Pua Kenikeni (Laupahoehoe Police Station) | 3-6-09:31 |

7.5.4 Hamakua

The Hamakua district is tropically lush along the lower elevations. The coast is marked by densely vegetated gulches and valleys highlighted by silvery green Kukui trees. The most famous of these is Waipio Valley. This valley is the most accessible in the series of windward valleys. The natural and scenic beauty of Waipio with its waterfalls and tropical rainforests has attracted people for many years.

Mauna Kea is also included in the Hamakua district and with Mauna Loa dominates the landscape along the Hamakua part of the Saddle Road.

The following list of sites are examples of natural beauty in the Hamakua district.

Table 7-7. Natural Beauty Sites, District of Hamakua

| Site | Tax Map Key | Ahupuaa or Region |
|---|-------------|-------------------|
| Kalopa State Park | 4-4-14:1 | Kalopa |
| Mauna Kea State Park area | 4-4-16:3 | Kaohe |
| Ahualoa Road | 4-5-10 | Kaao-Nienie |
| Nienie (Native forest) | 4-6-12:25 | Nienie |
| Viewpoint—Lookout Waipio Valley, Kukuihaele | 4-8-04:17 | Lalakea |

Table 7-7. Natural Beauty Sites, District of Hamakua (Continued)

| Site | Tax Map Key | Ahupuaa or Region |
|--|--------------|--------------------------------|
| Windward Valley System: --Muliwai to Awini; --Waimanu Valley Area; --Waipio Valley Area | 4-9-01 to 15 | Waipio, Muliwai-Awini, Waimanu |
| Hiiilawe Falls | 4-9-09 | Waipio |

The following designated exceptional trees are adopted by ordinance.

Table 7-8. Exceptional Trees, District of Hamakua

| Tree | Tax Map Key |
|------------------------------------|-------------|
| Ohia Lehua (Kalopa State Park) (1) | 4-4-14:1 |
| Hame (Kalopa State Park) | 4-4-14:1 |
| Kopiko (Kalopa State Park) (1) | 4-4-14:1 |
| Ohia Lehua (Kalopa State Park) (2) | 4-4-14:1 |
| Ohia Lehua (Kalopa State Park) (3) | 4-4-14:1 |
| Kopiko (Kalopa State Park) (2) | 4-4-14:1 |
| Ohia Lehua (Kalopa State Park) (4) | 4-4-14:1 |
| Koa (Kalopa State Park) | 4-4-14:1 |
| Ohia Lehua (Kalopa State Park) (5) | 4-4-14:1 |

7.5.5 North Kohala

The natural beauty of the leeward area of North Kohala is characterized by undulating hills and gullies. The arid landform slopes gently from the eroded higher elevations of the North Kohala Mountains to the sheltered coastal waters. The shallow soil cover and grasslands are cut by numerous gullies which empty storm waters into embayments along the coast. Akoni Pule highway bisects the area along the lower elevation and provides distant views to both the coast and uplands.

On the windward side of North Kohala, the landscape takes on the appearance of a tropical rain forest with lush green vegetation in the valleys and gulches. At the eastern end of the highway is Pololu Valley and a view down the coast towards Hamakua.

The Kohala mountains provide a backdrop to both these landscapes, and along the higher elevations of windward Kohala are green grazing lands with a panoramic vista of the coast.

§7.5.6: South Kohala

The following list of sites are examples of natural beauty in the North Kohala district.

Table 7-9. Natural Beauty Sites, District of North Kohala

| Site | Tax Map Key | Ahupuaa or Region |
|---|----------------------|-------------------|
| Windward Valley System: --Honokane Valley; --Islands off Awini Valley; --Pololu Valley | 5-1-01 & 02 | Awini, Pololu |
| Viewpoint-Pololu Valley | 5-2-01:1 | Pololu |
| Akoakoa Point | 5-2-01:7 | Waiapuka |
| Nanue Bay Area | 5-2-01:7, 8 | Waiapuka |
| Kapanaia Bay Area | 5-2-01:14; 5-2-07 | Makapala, Aamakao |
| Keokea Beach & Kalalae Pt. | 5-2-01:14-1 6 | Makapala |
| Kauhola Point | 5-3-07:1 | Kukuiwaluhia |
| Indian Banyan trees at Chalon International of Hawaii's office in Hawi | 5-5-2:23 | Hawi |
| Upolu Point | 5-5-06:7 | Kokoiki-Upolu |
| Old Honoipu Landing | 5-6-02 | Puakea |
| Kapaa Park | 5-6-01:60 | Kapaa |
| Mahukona Harbor and Park | 5-7-03:3, 4, 14 | Mahukona-Hihiu |
| Keawanui Bay Area | 5-8-01 | Kehena, Puanui |
| Kaiopae Point | 5-9-01:6 | Waiaka |
| Waiakailio Bay Area | 5-9-01:8 | Kahualilii |
| Coastline viewplane from Akoni-Pule Highway | Various | |
| Coastline viewplane from Kohala Mountain Road | Various | |
| Ironwood trees along Kohala Mountain Road | Various | |

7.5.6 South Kohala

The district of South Kohala has two distinct physical environments, each with its own kind of natural beauty.

The Waimea region lies in a plateau between the Kohala mountains and Mauna Kea. The Kohala mountains provide a backdrop of rolling hills and volcanic cones covered with pastures kept green by fog, fine mist, and rain. Mauna Kea provides a distant but dramatic mass as it rises steeply above the plateau. Viewed at a distance, Waimea town lies nestled at the base of the Kohala mountains.

West of Waimea, the land forms a long slope down to the arid coastline; changing in color with drops in elevation from green to pale yellow and beige to the red and browns of the coast. The edge of the coast is contrasted with green kiawe stands, pockets of white sand beaches, and coastal waters. Barren lava flows stretch down from Mauna Loa and meet the sea near the southern boundary of South Kohala.

Between these two extremes, the range of landscape quickly changes. Along the mauka road to North Kohala, there are impressive viewplanes to Mauna Kea, Mauna Loa and Hualalai.

The pastures and pu’u immediately above Waimea Town have been identified as a vista of exceptional natural beauty. This area is best defined by running an imaginary line from the top of the trees below Hokuula west to the trees at Hawaii Preparatory Academy and east to the tree line above Church Row.

The following list of sites are examples of natural beauty in the South Kohala district.

Table 7-10. Natural Beauty Sites, District of South Kohala

| Site | Tax Map Key | Ahupuaa or Region |
|--|--------------------------|-------------------|
| Viewpoint (Puu Makela) | 6-2-01:25 | Kawaihae 2nd |
| Mauumae Bay/Beach | 6-2-02 | Kawaihae 2nd |
| Kaunaoa Bay/Beach | 6-2-02:4 | Ouli |
| Kaluhiikanu Beach | 6-2-02:6 | Kawaihae 2nd |
| Ohaiula Beach (Spencer Park) | 6-2-02:8 | Kawaihae 2nd |
| Upper Waipio Lookout | 6-3-01:4 | Waipio |
| View of Kohala mountain | 6-5-01 | Waiauaia |
| Na Puu (Waimea): --Puu Laelae; --Hokuula; --Puuiki | 6-5-01 | Keoniki-Puuiki |
| Waimea Church Row and Surrounding Churches | 6-5-04:1-6, 8 | Waikoloa (Waimea) |
| Hapuna Bay/Beach | 6-6-01:8 | Lalamilo |
| Kaunaoa Point | 6-6-02:38 | Ouli |
| Waimea Nature Park (Ulu Laau) | 6-6-03:7 | Lalamilo |
| Scenic countryside around Waikii | 6-7-01:3 | Waikoloa |
| Makaiwa Bay and Pond, Keawanui | 6-8-22 | Kalahui-puaa |
| Pauoa Bay Area | 6-8-22 | Kalahui-puaa |
| Puako Bay Area | 6-9-01:2; 6-9-02:7, 8 | Lalamilo |
| Anaehoomalu Bay Area | 6-9-01:13 | Anaehoomalu |
| Wailea Bay Area | 6-9-02:2 | Lalamilo |
| Viewplane along Queen Ka’ahumanu Highway looking mauka and makai | Various | |

7.5.7 North And South Kona Districts

The Kona districts have long attracted people because of their natural beauty. Although man-made structures are in some places dominant, the vast expanse of the Kona landscape is still the area's most striking feature.

North Kona, in the area called Kekaha, is characterized by a sense of openness created by expansive areas of lava flows. Vegetation on the lava is comprised of low pockets of grasses and scrub trees. From the coastline, the land climbs slowly to the distant saddle plateau between Mauna Kea and Mauna Loa. This long natural grade also contributes to the sense of openness and space.

The rest of North Kona is dominated by Hualalai. Its steep slopes provide a green backdrop when viewed from the coast, or spectacular views of the coastline, ocean and horizon from higher elevations.

Part of Kona's natural beauty is also due to the wide range of climatic conditions in a relatively short distance. Such variations extending from the coastal areas to the higher elevations are evidenced by changes in vegetation, producing a wide scope of different physical environments.

The following list of sites are examples of natural beauty in the Kona districts.

North Kona

Table 7-11. Natural Beauty Sites, District of North Kona

| Site | Tax Map Key | Ahupuaa or Region |
|--|-----------------------|-----------------------|
| Puu Waawaa | 7-1-01:4 | Puuwaawaa |
| Kiholo Bay/Beach Area | 7-1-02:8 | Puuwaawaa |
| Keawaiki | 7-1-02:8; 7-1-03:2 | Puuwaawaa; Puuanahulu |
| Hualalai | 7-2-01, 7-8-01 | Kaupulehu |
| Kaupulehu | 7-2-03:1, 2 | Kaupulehu |
| Kua Bay Area | 7-2-04 | Maniniowali |
| Opae Ula Pond | 7-2-04:1 | Makalawena |
| Makalawena | 7-2-04:1 | Makalawena |
| Kahoiawa | 7-2-04:3, 4 | Awakee |
| Kakapa Bay Area | 7-2-04:4 | Kukio 2nd |
| Kukio Bay/Beach Area | 7-2-04:5 | Kukio 1st |
| Mahaiula Bay/Beach Area | 7-2-05:3 | Mahaiula |
| Kaloko Pond | 7-3-09:2 | Kaloko |
| Honokohau Fish Pond | 7-4-08 | Kealakehe |
| Honokohau coastline | 7-4-08:4, 3 | Honokohau-Kealakehe |
| Aimakapa | 7-4-08:10 | Honokohau |
| White Sand Beach | 7-4-08:10 | Honokohau |
| White Sand Beach | 7-5-05:7 | Keahuolu |
| Viewplane from Kuakini Highway going mauka & makai | 7-7 and 7-8 | Holualoa-Keauhou |
| Viewplane from Kamehameha III Road going mauka & makai | 7-8-10 | Kahaluu-Keauhou |
| Keauhou | 7-8-12 | Keauhou 1 & 2 |
| Kahaluu Bay Area | 7-8-14 | Kahaluu 2 |
| Viewplane along Queen Ka'ahumanu Highway going mauka and makai | Various | Various |

South Kona

Table 7-12. Natural Beauty Sites, District of South Kona

| Site | Tax Map Key | Ahupuaa or Region |
|---|--|---|
| Kealakekua Bay from Kaawaloa Road and Lower Government Road | 8-1-07:1; 8-1-10:1, 2; 8-1-11; 8-2-02, 04 | Keopuka, Kaawaloa, Kaawaloa, Kealakekua |
| Viewpoint | 8-3-03 | Kahauloa (2) |
| Cove | 8-3-04:1 | Keeki (1) |

§7.5.8: Ka'u

Table 7-12. Natural Beauty Sites, District of South Kona (Continued)

| Site | Tax Map Key | Ahupuaa or Region |
|---|----------------|-------------------|
| White Sand Beach | 8-3-04:4 | Keei (1) |
| Viewpoint (Palemano Pt.) | 8-3-04:5 | Keei (1) |
| Honaunau Bay & Scenic View from Ke Ala o Keawe Road | 8-4-11, 12, 13 | Honaunau, Keokea |
| Kealia Beach | 8-5-05:1 | Kealia |
| Kiilae | 8-5-05:19 | Kiilae |
| Hookena—Kauhako Bay Area | 8-6-13, 14 | Hookena, Kauhako |
| Milolii area | 8-9-04 | Milolii |
| Lava flows of 1950, 1926 and 1919 | Various | Various |

The following designated exceptional trees are adopted by ordinance.

Table 7-13. Exceptional Trees, District of South Kona

| Tree | Tax Map Key |
|------------|-------------|
| Pili Nut | 8-1-09:1 |
| Loulu Palm | 8-9-06:4 |

7.5.8 Ka'u

Within the Ka'u district is located most of Hawaii Volcanoes National Park. The park is a natural area with a minimum of man-made objects blended into the character of the physical environment. The landscape is a contrast between open lava land with little or no vegetation and dense ohia lehua forests.

In the southern part of Ka'u the natural beauty of the landscape is characterized by vistas from the mountain slopes to the ocean. The coast is highlighted by Manuka Bay, Green Sands Beach, and Punaluu Black Sand Beach.

The following list of sites are examples of natural beauty in the Ka'u district.

Table 7-14. Natural Beauty Sites, District of Ka'u

| Site | Tax Map Key | Ahupuaa or Region |
|--------------------------------------|-----------------|-------------------|
| Manuka Bay | 9-1-01:3 | Manuka |
| Pohue Bay | 9-2-01:1 | Kahuku |
| Volcano area including National Park | 9-2-01:4;9-9-01 | Kahuku, Keauhou |

Table 7-14. Natural Beauty Sites, District of Ka'u (Continued)

| Site | Tax Map Key | Ahupuaa or Region |
|---|---------------------|---------------------|
| South Point (Ka Lae) | 9-3-01:1-3, 7, 9 | Pakini Iki, Kamaoa |
| Mahana Bay | 9-3-01:2 | Kamaoa |
| Waiakukini | 9-3-01:6 | Pakini Nui |
| Kaalualu Bay | 9-4-01: 12, 14 | Kiolakaa |
| Honuapo | 9-5-14:1, 7 | Honuapo |
| Kawa (Kawaa) Bay and Spring | 9-5-16:20; 9-5-17:7 | Kaalaiki, Hilea Nui |
| Ninole Cove & Springs | 9-5-19:12 | Ninole |
| Punaluu Black Sand Beach | 9-6-01 | Punaluu |
| Lava Flows of 1868, 1887, & 1907 | Various | Various |
| View of Mauna Loa from Volcano-Ka'u Highway | Various | Various |
| Scenic view of shoreline between Pahala and Punaluu | Various | Various |
| Waiohinu Park | Various | Various |
| Na puu: Enuhe, Makanau, Kaiholena and One | Various | Various |

The following designated exceptional trees are adopted by ordinance.

Table 7-15. Exceptional Trees, District of Ka'u

| Tree | Tax Map Key |
|---------------------------|-------------|
| Kokio (Manuka State Park) | 9-1-01 |
| 'Ohe (Manuka State Park) | 9-1-01 |

§7.5.8: Ka'u



NATURAL RESOURCES AND SHORELINE

8.1 INTRODUCTION AND ANALYSIS

The natural resources of the island of Hawaii are the physical and environmental assets that are recognized as useful, valuable, and desirable. These natural resources include, but are not limited to, the land, water, air, flora, fauna, soils, geologic features, geothermal steam, climate, wind, sunshine, ocean waters, and shoreline. Some of these resources are finite and irreplaceable. However, several are replaceable at extreme cost and others are renewable. The island's growing population and expanding urbanization places a greater demand on the limited resource base. Thus, in order to conserve these resources, best management practices and enforcement of zoning and environmental laws are critical. Some of these resources have been covered in other sections in the General Plan.

Largest and youngest of the Hawaiian Chain, the island of Hawaii covers a land area of 4,028 square miles with 4.4 square miles of inland water bodies, and is still growing. The Big Island, as it is known today, was formed by five volcanoes and three - Mauna Loa, Hualalai, and Kilauea, are still active. Extensive scientific research on active volcanic processes is being conducted. This is the only place in the United States where such processes can be continuously studied. Land and marine volcanic regions are also possible sources of geothermal energy. At 13,796 feet above sea level, Mauna Kea is the tallest of the island's mountains. The topography of the island extends from craggy ocean cliffs and beaches of black, green and golden sand to snow-covered mountain peaks during the winter months. Vegetative cover generally corresponds with elevation and ranges from tropical rainforest to grazing land to barren lava fields. Leeward and windward directions are equally important in determining vegetation types and landscape characteristics. In some windward areas, rainfall reaches an average of 300 inches annually, while some leeward areas have virtually no rainfall throughout the year.

Temperature drops consistently with higher elevation. Coastal regions are warm and semi-tropical, while frost is not unusual above the 4,000-foot level. The purity of atmospheric conditions at higher elevations has attracted scientific research. Fresh and marine waters are important to the County. Potable water is an understood necessity. The marine waters of the island and the plant and animal life within them are of dietary, recreational, and scientific importance.

§8.1: Introduction And Analysis

The soils of the County consist of various forms and stages of volcanic lava and ash. The young age and form of some lava make certain areas temporarily non-productive.

Throughout the island, there are pockets of endemic vegetation. These are important botanical remnants with scientific significance and are part of our natural heritage. Forest areas of both native and introduced species are additionally important as watershed areas and as natural means of controlling erosion. The flora and fauna, both native and introduced, are used as nutritional and recreational resources by numerous residents.

The island has more than 305 miles of coastline, but approximately 75 per cent is comprised of cliffs of varying height. The porous nature of the lava flows have produced unique ecological niches in the anchialine ponds along the coast. The coastline can be divided into seven general areas.

The Hamakua coast, from near Waipio Valley to Hilo Bay, is comprised of a sea cliff 100 to 300 feet high. Along the Hamakua Coast are boulder beaches that have formed at the mouths of valleys and the numerous gulches. From Hilo to Leleiwi Point to Keaau, the rocky shoreline of the Hilo coast is highly irregular.

The Puna coast from Keaau along Cape Kumukahi to Kalapana is partly low sea cliff and partly the constructional surface of recent lava flows. The irregularity of the coast a few miles to either side of Pohoiki is the result of several earthquakes and subsidence. There are also black sand beaches on the Puna coast that were created when hot molten lava reached the ocean, solidified, and shattered in the surf.

The coast of Ka'u and South Kona varies in composition and height. Sections are formed of soil, other areas are pahoehoe benches or a'a cliffs of varying height. The cliffs are especially high where the major sets of faults are close to and parallel to the sea. Several cones are present along the shoreline and some have adjacent black sand beaches.

The low coastline of North Kona extends north from the end of the fault-controlled sea cliff of Kealakekua Bay to Kawaihae Harbor. Like the northern Puna coast, the shoreline is highly irregular with sea cliffs a few feet high. There are also pocket beaches found along bays between adjacent flows. The best beaches on the island are along the coast between Kailua-Kona and Kawaihae.

The west and north slopes of the Kohala volcano from north of Kawaihae to Pololu Valley are marked by sea cliffs of moderate to low height. The coastal cliffs are interrupted by pockets of boulder beaches at the mouths of the intermittent gullies and small streams.

§8.1: Introduction And Analysis

The coastline along the windward deep valleys between Pololu and Waipio alternates between steep cliffs rising as high as 1,400 feet and boulder or sand beaches fronting the deep valleys.

The State's Shoreline Setback statute was passed in 1970. It established a restrictive zone 40 feet from the upper reaches of the wash of waves (20 feet for certain parcels) where construction and other coastal alterations are generally prohibited except by a variance procedure.

The Federal Coastal Zone Management (CZM) Act (Public Law 92-583) was signed into law in 1972. This Act affirms a national interest in the effective protection and development of the coastal zone and provides assistance and encouragement to coastal States to develop and implement rational programs for managing their coastal zones. In 1975, the Legislature enacted a Shoreline Protection Act which established such an interim program through a Special Management Area (SMA) extending a minimum of 100 yards inland from the shoreline vegetation or debris line. Guidelines to manage and protect the resources in the SMA were set forth by the Shoreline Protection Act. In 1977, the Hawaii Coastal Zone Management (CZM) Act became law and incorporated many of the features of the Shoreline Protection law and mandated objectives and policies for the management of Hawaii's coastal zone.

The Public Access Shoreline Hawaii (PASH) decision resulted from the implementation of the CZM and the SMA. This decision rendered by the Hawaii Supreme Court in 1995 unanimously upheld the validity of native Hawaiian gathering rights that were asserted by PASH and other individuals during the SMA permit proceedings before the County of Hawaii Planning Commission. The decision spoke to the standing of Hawaiian gathering rights and the governments' duty toward protecting those rights.

In addition to surface and coastal natural resources, the island also possesses sub-surface resources. Areas in Puna have been designated geothermal sub-zones for the development of geothermal energy and other areas of the island contain geological features such as lava tube caves.

Lava tube caves are among the island's more important geological natural resource. The island has thousands of lava tubes, but only a few are large enough to be lava tube caves. On Kilauea volcano, Kazumura cave is the longest lava tube cave in the world, at more than 30 miles long. Kaumana Cave is an important historic site, formed in the 1881 Mauna Loa lava flow. Other large lava tube caves exist on Mauna Loa, Hualalai, and possibly Mauna Kea.

Among the most significant of the island's natural resources are upland forests that provide the essential groundwater recharge areas. All groundwater sources in North and South Kona ultimately depend upon recharge that primarily occurs in a band between the 1,500 and 5,500-foot elevations. In the lower part of this band, rainfall

dominates from approximately the 1,500 to 3,000-foot elevation. In the upper part of this band, above the 3,000-foot elevation, fog that collects on trees and drips to the ground is a major contributor to the aquifer. In recognition of the importance of the mauka Kona area for watershed and other environmental values, the County Council established a policy in Resolution No. 330-96 (1996) that no lands in North or South Kona above 2,500 feet in elevation (except in the existing Kaloko Mauka Subdivision) should be rezoned to lot sizes less than 20 acres, without a corresponding reduction in density on contiguous lands. In Kaloko Mauka, the Council found that the concerns could be mitigated by specific rezoning conditions which would require that at least 80 per cent of the property be kept in forest cover, in the area above 3,000 feet in elevation (Resolution No. 58-97). A similar concept was expressed in the conditions of rezoning for Kealakekua Development Company, which required an 8,000-acre forest management area in the mauka area of the property while rezoning the lower portion to a higher density.

8.2 GOALS

- (a) Protect and conserve the natural resources from undue exploitation, encroachment and damage.
- (b) Provide opportunities for recreational, economic, and educational needs without despoiling or endangering natural resources.
- (c) Protect and promote the prudent use of Hawaii's unique, fragile, and significant environmental and natural resources.
- (d) Protect rare or endangered species and habitats native to Hawaii.
- (e) Protect and effectively manage Hawaii's open space, watersheds, shoreline, and natural areas.
- (f) Ensure that alterations to existing land forms, vegetation, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of an earthquake.

8.3 POLICIES

- (a) Require users of natural resources to conduct their activities in a manner that avoids or minimizes adverse effects on the environment.
- (b) Encourage a program of collection and dissemination of basic data concerning natural resources.
- (c) Maintain the shoreline for recreational, cultural, educational, and/or scientific uses in a manner that is protective of resources and is of the maximum benefit to the general public.
- (d) Protect the shoreline from the encroachment of man-made improvements and structures.

- (e) Coordinate programs to protect natural resources with other government agencies.
- (f) Investigate methods of beach replenishment and sand erosion control.
- (g) Promote sound management and development of Hawaii's land and marine resources for potential economic benefit.
- (h) Encourage public and private agencies to manage the natural resources in a manner that avoids or minimizes adverse effects on the environment and depletion of energy and natural resources to the fullest extent.
- (i) Encourage an overall conservation ethic in the use of Hawaii's resources by protecting, preserving, and conserving the critical and significant natural resources of the County of Hawaii.
- (j) Encourage the protection of watersheds, forest, brush, and grassland from destructive agents and uses.
- (k) An identification and inventory of forest lands suitable for watershed purposes should be conducted jointly by County, appropriate State and Federal agencies, and private landowners.
- (l) Work with the appropriate State, Federal agencies, and private landowners to establish a program to manage and protect identified watersheds.
- (m) Encourage appropriate State agencies to review and designate forest and watershed areas into the conservation district during State land use boundary comprehensive reviews.
- (n) The installation of utility facilities, highways and related public improvements in natural and wildland areas should avoid the contamination or despoilment of natural resources where feasible by design review, conservation principles, and by mutual agreement between the County and affected agencies.
- (o) Encourage the continued identification and inclusion of unique wildlife habitat areas of native Hawaiian flora and fauna within the Natural Area Reserve System.
- (p) Encourage the use of native plants for screening and landscaping.
- (q) Develop policies by which native Hawaiian gathering rights will be protected as identified under judicial decisions.
- (r) Ensure public access is provided to the shoreline, public trails and hunting areas, including free public parking where appropriate.
- (s) Establish a system of pedestrian access trails to places of scenic, historic, cultural, natural, or recreational values.
- (t) Preserve and protect significant lava tube caves.
- (u) Ensure that activities authorized or funded by the County do not damage important natural resources.
- (v) Within the Kona high rainfall/fog-drip belt, ground disturbing activities such as excessive soil compaction and excessive removal of vegetative cover should be minimized and mitigated consistent with management strategies that encourage

§8.4: Standards

the retention of existing forested and pasture areas, reforestation, minimal coverage by impervious surfaces and other strategies that encourage effective infiltration to groundwater.

- (w) Implement Council Resolution Nos. 330-96 and 58-97 in land use approvals.
- (x) Create incentives for landowners to retain and re-establish forest cover in upland watershed areas with emphasis on native forest species.

8.4 STANDARDS

The following shall be considered for the protection and conservation of natural resources.

- (a) Areas necessary for the protection and propagation of specified endangered native wildlife, and conservation for natural ecosystems of endemic plants, fish and wildlife.
- (b) Lands necessary for the preservation of forests, park lands, wilderness and beach areas.
- (c) Lands with a general slope of 20 per cent or more that provide open space amenities or possess unusual scenic qualities.
- (d) Lands necessary for the protection of watersheds, water sources and water supplies.
- (e) Lands with topographic, locational, soils, climate or other environmental factors that may not be normally adaptable or required for urban, rural, agricultural or public use.
- (f) The Coastal Zone and Special Management Area as defined by statute and in accordance with the adopted objectives and guidelines.



HOUSING

9.1 INTRODUCTION AND ANALYSIS

Housing provides more than just shelter from the natural elements. A person's home is not only a place of security and comfort, but also a place for entertainment and recreation. Housing also allows a person to express his/her individual living styles by providing a place from which one can seek a psychological, sociological, economic and aesthetic balance. If the various functions that take place in the home do not meet the individual's personal and social needs, a housing problem may exist for that person. Housing programs, therefore, influence and are influenced by the many diverse needs of a person or persons.

In an economic setting, the construction of housing is an essential contributor to business, industry and employment. The location of housing on the other hand is dependent upon the location of other economic and employment opportunities, such as agriculture or resort developments.

In the physical and environmental setting, housing and its residential land use component utilizes a significant portion of the County's urban lands. The placement or settlement patterns of these residential lands and the form of housing are major influences on the environment and aesthetic setting of the island.

In the social and human realm, adequate housing is one of the primary factors that provides a person a sense of satisfaction and well being. For most families, it is a major expenditure of the household income and represents, in varying degrees, long term commitments to a place and/or community. In turn, these commitments contribute to a community's sense of well being and stability. When the cost of land, land improvements and home construction increases beyond a commensurate rise in personal income, it tends to discourage and prevent many individuals and families from purchasing a home.

From governments' perspective, adequate housing for residents is part of the considerations of public health, welfare and safety. Housing and residential use of land is a generator of government revenue through local real property taxes. The revenues are balanced by significant expenditures of public funds for roads, schools, protective services and other capital improvement projects that service residential areas. Thus, the provision of housing requires the coordination of planning and implementation on all levels of government.

The availability of housing is dependent on a number of interrelated factors, including the availability of appropriately zoned land and infrastructure, and the cost of raw land and its

§9.1: Introduction And Analysis

development. The Housing element must consider future costs of constructing a house and the ability of individuals to purchase or rent these units. In the social sense, the provision of housing needs to consider the kinds of people who reside here or are likely to reside here and their preferences with respect to type, size, location and other factors.

In the collective sense, the Housing Element is related to all other elements of the General Plan. It is most directly related to the Land Use element, Single family and Multiple family residential sections. Moreover, the Housing Element is directly influenced by the growth directions that the County wishes to take.

The Role of Government

Since the 1930s, the Federal government has played a major role in the provision of housing and home ownership through direct housing construction projects, home mortgage insurance programs, loan programs for special groups such as veterans and farmers, and direct subsidies to State governments.

The Territory of Hawaii and subsequently, the State of Hawaii, through the Hawaii Housing Authority, has been responsible for administering Federal housing programs. Until the mid-1970, the State Hawaii Housing Authority served as the major agency to develop rental housing projects for low income families and provide housing for sale to low and moderate income groups. In 1998, three State housing agencies, including the Hawaii Housing Authority, were consolidated into the Housing and Community Development Corporation of Hawaii (HCDCH). The Hawaii Community Development Corporation of Hawaii seeks to expand the supply of safe and affordable housing; provide for well-maintained, socio-economically integrated housing projects; assist residents in reaching higher levels of self-sufficiency; and effectively address the housing needs of Hawaii's residents.

In addition, through a 1920 Congressional act, lands have been set aside for eligible native Hawaiians for residential and agricultural purposes. Through the State Hawaiian Homes Commission and Department of Hawaiian Home Lands, houselots on a leasehold basis are made available to eligible native Hawaiians. In the mid-80s, the Department established an accelerated program to provide lands for residential and agricultural purposes.

Since the adoption of the County of Hawaii's General Plan in 1971, Federal housing and community redevelopment programs have been reorganized under the 1974 Housing and Community Development Act. This federal legislation placed much of the initiative for addressing community housing needs to the local government level.

Additionally, county governments have been granted similar and parallel authorities to the State's Hawaii Housing Agency. As a result, the County established the Hawaii County Housing Agency (HCHA) and the Office of Housing and Community Devel-

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The change in the Federal programs are largely reflected in drastic reductions in funds for housing projects and programs, and reduced subsidies to the State. It is also apparent that there will continue to be a reduction in Federal funds, particularly for the construction of housing for low and moderate income groups. As the major source of funds for housing programs, these changes have had major implications on the County's role in the provision of housing for its residents; particularly since significant factors that contribute to the ability of residents to purchase homes are outside the direct influence of the County government and are external to the economy of Hawaii. These factors include loan interest rates that are significantly impacted by federal financial and monetary policies.

The development of assisted housing in Hawaii County will increasingly depend on non-Federal funds. Additionally, a broad range of mechanisms must be utilized by the County to facilitate, coordinate and implement the development of both assisted and market residential housing.

Profile

In order to identify and anticipate the housing needs within the County of Hawaii, and to encourage the opportunities for housing, the demographic, economic, housing construction and land inventory data for the County are provided in tables on the following pages.

Analysis - Trends

Several major issues and problems faced by Hawaii County continue to involve housing. Rapid population growth in some areas of the County has not been accompanied by parallel growth in affordable residential housing construction. The rate of increase in the price of land, the cost of housing construction and the rate of growth in earning power of many residents also contribute to the lack of affordable housing opportunities. Thus, proportionately fewer residents are able to afford the purchase of a home. In 1997, SMS Research & Marketing Services and Locations, Inc., in cooperation with the State Housing Finance and Development Corporation (HFDC) and the various Counties' housing agencies, prepared the Hawaii Housing Policy Study Update 1997 that reviewed various housing issues throughout the State of Hawaii. According to the study, a family with a median annual income of approximately \$30,300 would qualify for an "affordable" home priced in the neighborhood of \$140,000. However, this study also concluded that approximately 36 per cent of the total households on this island fall below the median annual income.

According to the 1999 Homeless Needs Assessment Study-Summary of Findings prepared by the State Housing and Community Development Corporation of Hawaii, the Department of Hawaiian Home Lands and the various counties, the most prominent need for unsheltered homeless people within the County of Hawaii is housing placement. The study found that existing housing placement services were only able to ser-

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vice 40 per cent of the unsheltered homeless people residing in the County, the largest percentage of who were lifetime or long-time residents. The study also estimated that there are between 585 and 733 sheltered/unsheltered homeless people islandwide. There are an estimated 10,871 individuals in the County defined as “hidden homeless”, or those who share accommodations with others dependent on public assistance for monthly shelter payments. According to experts in homeless services, the most prominent need of service providers was additional funding for services such as transitional housing, affordable housing, job and life skills training, and other assistance services.

The ability of households to purchase or rent a home, or what is commonly understood as "affordability", is dependent upon many factors that vary among households and individuals' choices in lifestyles and also differ due to location and financing. While quantitative descriptions of need groups and limitations may be made for the present, only general trends and order of magnitude estimates may be made for the future. It is expected, however, that the proportion of the resident population requiring some assistance in purchasing a home will continue to increase.

Housing sales activity, both new and resale, has been uneven and difficult to predict. The housing industry's traditional construction cycle has been complicated by periods of high interest rates. Federal housing policies and funding have also changed. The net result is that housing activity and housing programs will be difficult to predict for the foreseeable future. Housing priorities and programs today may be very different from those in the future.

In existing urban areas, the supply of readily available housing and residential zoned lands is nearing a point where flexibility in choice of location and price will be limited and will contribute to rising costs of housing unless additional and alternative areas are made available for residential development.

In rural and agricultural areas, affordable housing for both independent farmers and agricultural employees place competitive demands on the land. In addition to the expanding urban needs, rural and agricultural lands are being sought for rural/residential estate use.

In addition, in rural areas, the age of the existing housing stock suggests that future new housing will be necessary to replace these units.

The increasing role of agriculture has created implications for housing of the agricultural worker. The residents of the rural areas of the County constitute a special population by virtue of their relative isolation, lower average incomes, lack of employment opportunities and mobility. The housing problems of these areas are proportionately more acute in the rural areas and communities than in the urbanized areas in the State.

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The residents of the rural areas tend to be agricultural workers or individuals directly employed in self-contained destination resort areas; industries that play a vital role in Hawaii's economy but tend to be associated with relatively low average annual income, particularly compared to non-service industry jobs.

County Profile

Table 9-1. Population and Households, County of Hawaii, 1980-2000

| Year | Population | Households |
|------|------------|---------------|
| 2000 | 148,677 | not available |
| 1997 | 141,848 | 49,617 |
| 1990 | 120,317 | 42,413 |
| 1980 | 92,053 | 29,237 |

Estimate-County of Hawaii Planning Department
 Estimate-County of Hawaii Data Book, 1998
 U.S. Census, 2000

Table 9-2. Inventory of Housing Units, County of Hawaii, 1992 & 1997

| Year | Total | Single Family | Multiple Family, Condominium, Other |
|------|--------|---------------|-------------------------------------|
| 1997 | 54,643 | 43,979 | 10,664 |
| 1992 | 45,408 | 36,170 | 9,238 |

Hawaii Housing Policy Study - SMS Research, 1997

Table 9-3. Housing Ownership vs. Rental, County of Hawaii, 1980, 1992 & 1997

| Year | Fee | Rental |
|------|------------|------------|
| 1997 | 33,446 72% | 12,825 28% |
| 1992 | 26,977 68% | 12,812 32% |
| 1980 | 17,731 61% | 11,506 39% |

Hawaii Housing Policy Study - SMS Research, 1997



Table 9-4. Housing Vacancy Rates, County of Hawaii, 1980, 1992 & 1997

| Year | Occupied | Vacant |
|------|------------|-----------|
| 1997 | 47,793 95% | 2,770 5% |
| 1992 | 41,461 95% | 2,231 5% |
| 1980 | 29,237 86% | 4,717 14% |

Hawaii Housing Policy Study - SMS Research, 1997

Table 9-5. Age of Housing Inventory, County of Hawaii, 1997

| Year | Age of Structure (Years) | | | |
|------------------|--------------------------|--------|--------|--------|
| | 0-7 | 8-20 | 21-30 | 30+ |
| 1997 | 9,627 | 11,335 | 10,398 | 12,619 |
| % of Total Units | 21.9 | 25.8 | 23.6 | 28.7 |

Hawaii Housing Policy Study - SMS Research, 1997

Table 9-6. Dwelling Units by Tax Map Zone, 1970, 1980, 1985 & 1997

| Tax Map Zone | Total | 1997 | 1985 | 1980 | 1970 | %Growth (annual) |
|--------------|-----------|--------|--------|--------|-------|------------------|
| Zone 1 | Puna | 10,902 | 4,925 | 4,126 | 1,891 | 8.6 |
| Zone 2 | S.Hilo | 16,346 | 15,188 | 14,301 | 9,585 | 2.3 |
| Zone 3 | N.Hilo | 626 | 621 | 581 | 511 | 1.0 |
| Zone 4 | Hamakua | 2,019 | 1,768 | 1,741 | 1,441 | 1.2 |
| Zone 5 | N. Kohala | 1,599 | 1,206 | 1,122 | 932 | 2.1 |
| Zone 6 | S. Kohala | 5,798 | 2,681 | 2,218 | 980 | 8.8 |
| Zone 7 | N. Kona | 12,254 | 9,150 | 7,540 | 2,485 | 9.1 |
| Zone 8 | S. Kona | 2,714 | 1,971 | 1,722 | 1,169 | 3.6 |
| Zone 9 | Ka'u | 2,385 | 1,647 | 1,441 | 963 | 3.9 |

Hawaii Housing Policy Study - SMS Research, 1997

§9.1: Introduction And Analysis

Table 9-7. Tax Parcels by Tax Map Zone, 1969, 1985 & 1999

| Tax Map Zone | District | 1999 | 1985 | 1969 | %Growth (1985-1999) |
|--------------|-----------|---------|---------|---------|---------------------|
| Total | | 124,930 | 120,353 | 101,848 | 3.8 |
| Zone 1 | Puna | 57,363 | 56,992 | 54,654 | 0.7 |
| Zone 2 | S. Hilo | 19,440 | 18,126 | 14,323 | 7.3 |
| Zone 3 | N. Hilo | 1,508 | 1,416 | 1,217 | 6.5 |
| Zone 4 | Hamakua | 3,801 | 3,601 | 2,857 | 5.6 |
| Zone 5 | N. Kohala | 2,957 | 2,284 | 1,712 | 29.5 |
| Zone 6 | S. Kohala | 6,218 | 4,822 | 2,526 | 30.0 |
| Zone 7 | N. Kona | 11,169 | 10,094 | 5,100 | 10.7 |
| Zone 8 | S. Kona | 5,529 | 5,737 | 4,770 | -3.6 |
| Zone 9 | Ka'u | 16,945 | 17,281 | 14,689 | -1.9 |

Hawaii Housing Policy Study - SMS Research, 1997
 Estimates – Planning Department

Table 9-8. Income Distribution by District, <\$25,000, 1970 to 1990

| District | Less than \$10,000 | | | \$10,000 to \$15,000 | | | \$15,000 to \$25,000 | | |
|-----------|--------------------|-------|-------|----------------------|-------|-------|----------------------|-------|-------|
| | 1970 | 1980 | 1990 | 1970 | 1980 | 1990 | 1970 | 1980 | 1990 |
| Puna | 783 | 1,340 | 1,709 | 254 | 701 | 863 | 146 | 965 | 1,414 |
| S. Hilo | 3,623 | 3,856 | 2,322 | 2,131 | 1,884 | 1,209 | 1,612 | 3,079 | 2,341 |
| N. Hilo | 282 | 161 | 425 | 62 | 90 | 316 | 80 | 172 | 678 |
| Hamakua | 662 | 388 | 131 | 254 | 237 | 88 | 132 | 524 | 259 |
| N. Kohala | 412 | 381 | 157 | 214 | 184 | 116 | 105 | 330 | 240 |
| S. Kohala | 317 | 284 | 248 | 123 | 323 | 182 | 97 | 510 | 378 |
| N. Kona | 622 | 1,110 | 707 | 313 | 649 | 590 | 202 | 1,275 | 1,376 |
| S. Kona | 377 | 526 | 361 | 185 | 313 | 199 | 199 | 420 | 499 |
| Ka'u | 510 | 343 | 212 | 153 | 222 | 270 | 88 | 417 | 350 |
| TOTAL | 7,588 | 8,389 | 6,272 | 3,689 | 4,603 | 3,833 | 2,661 | 7,692 | 7,535 |

U.S. Census
 County of Hawaii Data Book, 1998; 1989 General Plan



Table 9-9. Income Distribution by District, >\$25,000, 1970 to 1990

| District | \$25,000 to \$50,000 | | | Over \$50,000 | | | Total Households | | |
|-----------|----------------------|-------|--------|---------------|-------|-------|------------------|--------|--------|
| | 1970 | 1980 | 1990 | 1970 | 1980 | 1990 | 1970 | 1980 | 1990 |
| Puna | 33 | 672 | 2,098 | 6 | 148 | 1,045 | 1,222 | 3,826 | 7,129 |
| S. Hilo | 403 | 3,694 | 4,404 | 92 | 728 | 3,559 | 7,861 | 13,241 | 13,835 |
| N. Hilo | 5 | 102 | 1,025 | 0 | 0 | 418 | 429 | 525 | 2,862 |
| Hamakua | 25 | 383 | 509 | 13 | 38 | 222 | 1,086 | 1,570 | 1,209 |
| N. Kohala | 16 | 123 | 495 | 11 | 18 | 291 | 758 | 1,036 | 1,299 |
| S. Kohala | 18 | 287 | 1,143 | 7 | 145 | 1,134 | 562 | 1,549 | 3,085 |
| N. Kona | 72 | 1,175 | 2,953 | 13 | 349 | 2,290 | 1,222 | 4,558 | 7,916 |
| S. Kona | 29 | 423 | 848 | 6 | 116 | 781 | 796 | 1,798 | 2,688 |
| Ka'u | 5 | 163 | 504 | 0 | 9 | 220 | 756 | 1,154 | 1,556 |
| TOTAL | 606 | 7,022 | 13,979 | 148 | 1,551 | 9,960 | 14,692 | 29,257 | 41,579 |

U.S. Census
County of Hawaii Data Book, 1998; 1989 General Plan

The United States Department of Agriculture-Rural Development Agency, formerly known as the Farmers Home Administration, has programs that have historically been targeted to rural households. However, these programs have been experiencing increased interest rates, cut backs in program funds, and a general curtailment in the effectiveness of the program.

At the same time, the smaller agricultural operators will not be able to easily carry the costs of providing homes for their employees, nor will it be as easy to identify the magnitude of the need and distribute opportunities for employee housing as it has been in the past with major sugar companies.

Housing for the elderly also presents changes for the future. Nationwide changes in the growing segment of the older population, due to technological advances in medicine have also impacted the County. The 60 and over age group will be the fastest growing sector of the population over the next twenty years. This group represented 13.7 per cent of the total population in 1985 and 17.3 per cent in 1990. According to the State Executive Office on Aging, the number of individuals statewide age 60 and over grew by 52.5 per cent between the years of 1980 and 1990 while the total State population grew by only 14.9 per cent. Those 85 years and older grew by 87 per cent during the same period. It is anticipated that by the Year 2020, one in every four residents in the State will be 60 years and older. Changes in social attitudes and expectations on both the part of the elderly and young may dictate changes in the types of structures necessary or desired by the elderly population.

§9.2: Goals

In addition to the increasing size of this population, the encouragement of retirement communities or the attractiveness of Hawaii as a place of retirement will require a re-assessment of housing and public service needs.

9.2 GOALS

- (a) Attain safe, sanitary, and livable housing for the residents of the County of Hawaii.
- (b) Attain a diversity of socio-economic housing mix throughout the different parts of the County.
- (c) Maintain a housing supply that allows a variety of choices.
- (d) Create viable communities with affordable housing and suitable living environments.
- (e) Improve and maintain the quality and affordability of the existing housing inventory.
- (f) Seek sufficient production of new affordable rental and fee-simple housing in the County in a variety of sizes to satisfactorily accommodate the needs and desires of families and individuals.
- (g) Ensure that housing is available to all persons regardless of age, sex, marital status, ethnic background, and income.
- (h) Make affordable housing available in reasonable proximity to employment centers.
- (i) Encourage and expand home ownership opportunities for residents.

9.3 POLICIES

- (a) Encourage a volume of construction and rehabilitation of housing sufficient to meet growth needs and correct existing deficiencies.
- (b) Encourage the construction of specially designed facilities or communities for elderly persons needing institutional care and small home care units for active elderly persons.
- (c) Encourage corporations and nonprofit organizations to participate in Federal, State and private programs to provide new and rehabilitated housing for low and moderate income families.
- (d) Support the construction of housing for minimum wage and agricultural workers.
- (e) Continue to review codes and ordinances for overly stringent restrictions that may impose unnecessary hardship and adopt amendments if warranted.
- (f) Continue to study and implement appropriate measures to curb property speculative practices that result in increased housing costs.

- (g) Large industries or developments that create a demand for housing shall provide employee housing based upon a ratio to be determined by an analysis of the locality's needs.
- (h) Formulate a program for housing that identifies specific mechanisms to implement the housing goals.
- (i) Intilize housing powers and programs to accomplish housing goals and seek out new programs and resources to address the housing needs of the residents.
- (j) Initiate and participate in activities with the private sector including the provision of leadership and expertise to neighborhoods and nonprofit organizations in the development of housing and community development projects.
- (k) Increase rental opportunities and choices in terms of quality, cost, amenity, style and size of housing, especially for low and moderate income households.
- (l) Support programs that improve, maintain, and rehabilitate the existing housing inventory to maintain the viability of existing communities.
- (m) Accommodate the housing requirements of special need groups including the elderly, handicapped, homeless and those residents in rural areas.
- (n) Investigate, develop, and promote the creation of new innovative and timely financing techniques and programs to reduce the cost of housing.
- (o) Encourage the use of suitable public lands for housing purposes in fee or lease.
- (p) Encourage the construction of homes for lease or lease with option to purchase.
- (q) Promote research and development of methods, programs, and activities including the review of regulatory requirements and procedures as they affect housing, to reduce the costs consistent with the public health, safety and welfare.
- (r) Adopt appropriate ordinances and rules as necessary to implement its housing programs and activities.
- (s) Utilize financing techniques that reduce the cost of housing, including the issuance of tax-exempt bonds and the implementation of interim financing programs.
- (t) Ensure that adequate infrastructure is available in appropriate locations to support the timely development of affordable housing.
- (u) Investigate the use of the County's taxing powers as a possible means to increase the supply of affordable housing.
- (v) Work with, encourage and support private sector efforts in the provision of affordable housing.
- (w) Encourage the development of affordable retirement communities.
- (x) Vacant lands in urban areas and urban expansion areas should be made available for residential uses before additional agricultural lands are converted into residential uses.

§9.4: Standards

- (y) Aid and encourage the development of a wide variety of housing to achieve a diversity of socio-economic housing mix.

9.4 STANDARDS

Housing standards shall consist of and comply with:

- (a) Building Code
- (b) Electrical Code
- (c) Plumbing Code
- (d) Zoning Code
- (e) Subdivision Code
- (f) Standards of the single-family and multiple residential land use elements.

9.5 DISTRICTS

The following are summary profiles and analyses of each district.

9.5.1 Puna

9.5.1.1 Profile

The Puna district continues to experience tremendous growth in population and housing construction. The availability of residential sized lots at relatively inexpensive prices, and its proximity to the Hilo urban and employment center has contributed to this growth.

Most of the growth in housing construction has been single-family residential units. This growth occurred in the non-conforming subdivisions created prior to the adoption of the zoning and subdivision codes and are without basic infrastructure. As a result, many of the homes are served by individual water catchments, electric generators, propane tanks and substandard roadways.

According to the Hawaii Housing Policy Update Study 1997, an additional 3,780 single family dwellings were constructed in the Puna District between the years 1990 and 1996; more than double the number constructed in the other districts. However, the Puna District also has the largest number of vacant parcels, which indicates further potential for in-filling of existing subdivisions.

The Hawaii Island Community Development Corporation (HICDC) has provided assistance with the construction of self-help housing within the Puna district. Since 1985, the Hawaii Island Community Development Corporation assisted with the de-

velopment of the 15 single-family residential units within the Pacific Paradise Gardens development and additional 20 units within Keaau.

Table 9-10. Population and Households, District of Puna, 1980 to 2000

| Year | Population | Households |
|------|------------|---------------|
| 2000 | 31,335 | Not available |
| 1990 | 20,781 | 7,136 |
| 1980 | 11,751 | 3,831 |

Economic Assessment, PKF Hawaii, January 2000
 County of Hawaii Data Book, 1998
 U.S. Census, 2000

Table 9-11. Existing Housing Inventory, District of Puna, 1992 & 1997

| Year | Total | Single Family | Multiple Family, Condominium |
|------|--------|---------------|------------------------------|
| 1997 | 10,872 | 10,818 | 54 |
| 1992 | 7,456 | 7,418 | 38 |

Hawaii Housing Policy Study – SMS Research, 1997

Table 9-12. Housing Ownership, District of Puna, 1992 & 1997

| Year | Single Family, % Fee Simple | % of All Units, Owner Occupied |
|------|-----------------------------|--------------------------------|
| 1997 | 97 | 59 |
| 1992 | 96 | 56 |

Hawaii Housing Policy Study - SMS Research, 1997

Table 9-13. Age of Housing Structures, District of Puna

| Type of Structure | Year Built | | | | | | | Total |
|------------------------------|------------|-------|-----------|-----------|-----------|-----------|-----------|--------|
| | No data | <1950 | 1950-1959 | 1960-1969 | 1970-1979 | 1980-1989 | 1990-1997 | |
| Single Family | 0 | 696 | 263 | 364 | 2,077 | 3,638 | 3,780 | 10,818 |
| Multiple Family, Condominium | 0 | 2 | 0 | 23 | 28 | 1 | 0 | 54 |

Hawaii Housing Policy Study - SMS Research, 1997

§9.5.2: South Hilo

According to the Hawaii Housing Policy Study Update 1997, there are approximately 8,155 households in the Puna District. Approximately 33 per cent of the households in Puna have annual household incomes of less than \$25,000. Approximately 18 per cent have annual household incomes of less than \$15,000. Nevertheless, approximately 82 per cent of the housing units are owned in fee. Another interesting figure is that 98 per cent of all housing units in the Puna District are single family dwellings, the highest percentage of all the districts on this island.

9.5.1.2 Courses of Action

- (a) Consider and encourage the use of a variety of mechanisms to provide the necessary infrastructure in nonconforming subdivisions.
- (b) Encourage the maintenance and rehabilitation of the existing housing inventory to maintain the viability of existing communities.

9.5.2 South Hilo

9.5.2.1 Profile

The South Hilo district remains the center for commercial, industrial, governmental and service activities for Hawaii County. The growth in population and housing construction in the district has slowed from its peak in the 1970's, which saw the construction of approximately 3,600 homes. Approximately 2,350 homes were constructed in the 1980s and in the last six years ending in 1996, an additional 1,710 homes were built.

Within Hilo, residential subdivisions have occurred mostly within the Kaumana, Waiakea Homesteads and Waiakea Uka areas (southwest portion of the city).

Nevertheless, available and accessible lands for residential use within the city limits and southeast of Wailuku River are very nearly reaching the limits presently allowed by the General Plan. Existing areas allowed for alternate urban expansion in the area between Kaumana and Waiakea will require infrastructure (including major access roads) improvements and are also severely limited by drainage and floodway zones. Without improvements in the channelization or diversion at upper elevations, there is limited potential for use.

Other housing problems continue to revolve around the provision of housing for low-income and elderly housing needs. According to 1990 census data, approximately 11 per cent of all families in the district of Hilo were below the poverty level.

Table 9-14. Population and Households, District of South Hilo, 1980 to 2000

| Year | Population | Households |
|------|------------|---------------|
| 2000 | 47,386 | Not available |
| 1990 | 44,639 | 15,533 |
| 1980 | 42,278 | 13,251 |

Economic Assessment, PKF Hawaii, January 2000
 County of Hawaii Data Book, 1998
 U.S. Census, 2000

Table 9-15. Existing Housing Inventory, District of South Hilo, 1992 & 1997

| Year | Total | Single Family | Multiple Family, Condominium |
|------|--------|---------------|------------------------------|
| 1997 | 16,035 | 13,829 | 2,206 |
| 1992 | 14,600 | 12,398 | 2,202 |

Hawaii Housing Policy Study – SMS Research, 1997

Table 9-16. Housing Ownership, District of South Hilo, 1992 & 1997

| Year | Single Family, % Fee Simple | % of All Units, Owner Occupied |
|------|-----------------------------|--------------------------------|
| 1997 | 94 | 61 |
| 1992 | 93 | 62 |

Hawaii Housing Policy Study - SMS Research, 1997

Table 9-17. Age of Housing Structures, District of South Hilo

| Type of Structure | Year Built | | | | | | | Total |
|------------------------------|------------|-------|-----------|-----------|-----------|-----------|-----------|--------|
| | No data | <1950 | 1950-1959 | 1960-1969 | 1970-1979 | 1980-1989 | 1990-1997 | |
| Single Family | 0 | 2,743 | 1,622 | 1,766 | 3,610 | 2,369 | 1,719 | 13,829 |
| Multiple Family, Condominium | 340 | 53 | 6 | 433 | 983 | 101 | 290 | 2,206 |

Hawaii Housing Policy Study - SMS Research, 1997

There has been a recurring shortage of housing for students at the University of Hawaii at Hilo. A study prepared for the State in 1985 concludes that the shortage of stu-

§9.5.3: North Hilo

dent housing has been a deterrent to the realization of an increase in enrollment at the Hilo Campus. A 1990 Housing Program Review found that in addition to the recurring housing shortage, all of the housing facilities are faced with serious maintenance and renovation needs.

The State's housing agency and the Office of Housing and Community Development has also participated in constructing 182 units for elderly housing within the district. Since 1985, the Hawaii Island Community Development Corporation has assisted with the construction of eight self-help single family dwellings in Pepekeo. The Hawaii County Economic Opportunity Council is responsible for the development of 30 single family self-help dwellings on Hawaiian Home Lands in Keaukaha during the past decade.

The State and County have been active in the Hilo area through subdivisions of State-owned lands for low and moderate income families.

9.5.2.2 Courses of Action

- (a) Encourage the State to provide student, faculty, and staff housing for the University of Hawaii at Hilo and the Hawaii Community College.
- (b) Aid and encourage in a variety of programs for the replacement or rehabilitation of housing units.
- (c) Aid and encourage housing projects for low and moderate income families, "gap-groups" and the elderly.
- (d) Aid and encourage the development of State lands for housing for all socio-economic levels through leasehold or purchase.

9.5.3 North Hilo

9.5.3.1 Profile

The communities of this district are the direct result of the former sugar industry. Housing in the past was provided by the sugar companies. The closing of Hilo Coast Processing sugar company in 1994 also terminated the sugar company's employee rental housing program.

The district has had little activity with respect to housing construction. Over half of the residential structures in the district are over 30 years old. Further, this district has seen a dramatic increase in fee home ownership during the 1990s. In the mid 1980s, only 40 per cent of homes in the district were owned in fee simple. With the closing of the sugar companies came the opportunity for many former plantation workers to purchase their homes. This dramatic change in homeownership is evidenced by 98 per cent of all homes in this district now owned in fee simple.

The district also has a limited supply of vacant parcels available for housing and the least amount of subdivision activity over the past few decades. However, since the district's economic and employment opportunities are anticipated to remain stable with little or no population growth, this limitation on the availability of lots is not likely to present or cause major housing problems for the district.

Table 9-18. Population and Households, District of North Hilo, 1980 to 2000

| Year | Population | Households |
|------|------------|---------------|
| 2000 | 1,720 | Not available |
| 1990 | 1,541 | 506 |
| 1980 | 1,679 | 510 |

Economic Assessment, PKF Hawaii, January 2000
 County of Hawaii Data Book, 1998
 U.S. Census, 2000

Table 9-19. Existing Housing Inventory, District of North Hilo, 1992 & 1997

| Year | Total | Single Family | Multiple Family, Condominium |
|------|-------|---------------|------------------------------|
| 1997 | 626 | 612 | 14 |
| 1992 | 599 | 585 | 14 |

Hawaii Housing Policy Study – SMS Research, 1997

Table 9-20. Housing Ownership, District of North Hilo, 1992 & 1997

| Year | Single Family, % Fee Simple | % of All Units, Owner Occupied |
|------|-----------------------------|--------------------------------|
| 1997 | 98 | 66 |
| 1992 | 98 | 46 |

Hawaii Housing Policy Study - SMS Research, 1997

Table 9-21. Age of Housing Structures, District of North Hilo

| Type of Structure | Year Built | | | | | | | Total |
|------------------------------|------------|-------|-----------|-----------|-----------|-----------|-----------|-------|
| | No data | <1950 | 1950-1959 | 1960-1969 | 1970-1979 | 1980-1989 | 1990-1997 | |
| Single Family | 0 | 235 | 49 | 38 | 109 | 98 | 83 | 612 |
| Multiple Family, Condominium | 0 | 10 | 0 | 0 | 0 | 0 | 4 | 14 |

Hawaii Housing Policy Study - SMS Research, 1997

9.5.3.2 Course of Action

- (a) Coordinate and participate with the State and Federal governments in providing rural housing programs for low and moderate income families, "gap groups" and the elderly.

9.5.4 Hamakua

9.5.4.1 Profile

Most of the historical population growth in the communities of this district was directly related to the growth of the now defunct sugar industry. However, a number of the dispersed communities in the area were created through the Homesteading Acts of the Territory of Hawaii.

The district has increased slightly in population from 5,128 in 1980 to approximately 6,108 in 2000. This was an increase of 10 per cent over a 20-year period. The relative proximity of this district to the South Kohala resort areas and urbanizing Waimea has contributed to defining the Hamakua District as a residential "bedroom" community to these employment centers. Upon the closing of the Hamakua Sugar Company in 1994 and the cessation of its housing programs for its employees, the Office of Housing and Community Development (OHCD) coordinated the use of Federal funds totaling \$1,600,000 to preserve the economic vitality and secure the social structure of communities from Hilo to Hamakua. This was accomplished by assisting the non-profit Hamakua Housing Corporation to subdivide the defunct Hamakua Sugar plantation camps into individual houselots. Assistance in obtaining title to the newly subdivided houselots was then provided to those former Hamakua Sugar Company's employees who participated in the final harvest. Upon completion of the conveyance process, OHCD established a program by which qualified owners of the plantation homes were given a \$2,250 grant specifically for emergency improvements to the plantation homes. Over 300 plantation homeowners benefited from this program. Other programs included the design of water distribution systems in Paauilo and Ookala, train-

Table 9-24. Housing Ownership, District of Hamakua, 1992 & 1997

| Year | Single Family, % Fee Simple | % of All Units, Owner Occupied |
|------|--------------------------------|-----------------------------------|
| 1997 | 98 | 67 |
| 1992 | 82 | 48 |

Hawaii Housing Policy Study - SMS Research, 1997

Table 9-25. Age of Housing Structures, District of Hamakua

| Type of Structure | Year Built | | | | | | | Total |
|------------------------------|------------|-------|-----------|-----------|-----------|-----------|-----------|-------|
| | No data | <1950 | 1950-1959 | 1960-1969 | 1970-1979 | 1980-1989 | 1990-1997 | |
| Single Family | 0 | 788 | 192 | 136 | 293 | 283 | 214 | 1,906 |
| Multiple Family, Condominium | 40 | 16 | 2 | 1 | 5 | 13 | 36 | 113 |

Hawaii Housing Policy Study - SMS Research, 1997

9.5.4.2 Course of Action

- (a) Aid and encourage programs to rehabilitate and replace the existing housing inventory, including consideration for self-help programs.

9.5.5 North Kohala

9.5.5.1 Profile

Since 1971, Kohala Sugar Company has terminated its sugar operations and many of the plantation's former employees moved out of the district to seek employment elsewhere. However, the district witnessed only a 2 per cent decrease in its population during the 1970s. Population in the 1980s grew at an annual rate of 3.2 per cent with the 1990s averaging about 2 per cent. The population increases by about 40 per cent between 1990 and 2000. Most of the residents of North Kohala are employed in agriculture, including ranching, as well as the visitor industry. Approximately 6.4 per cent of the households in the district reported incomes below the poverty level in 1990.

Table 9-26. Population and Households, District of North Kohala, 1980 to 2000

| Year | Population | Households |
|------|------------|---------------|
| 2000 | 6,038 | Not available |
| 1990 | 4,291 | 1,351 |
| 1980 | 3,249 | 1,022 |

Economic Assessment, PKF Hawaii, January 2000
 County of Hawaii Data Book, 1998
 U.S. Census, 2000

Table 9-27. Existing Housing Inventory, District of North Kohala, 1992 & 1997

| Year | Total | Single Family | Multiple Family, Condominium |
|------|-------|---------------|------------------------------|
| 1997 | 1,599 | 1,496 | 103 |
| 1992 | 1,228 | 1,210 | 18 |

Hawaii Housing Policy Study – SMS Research, 1997

Table 9-28. Housing Ownership, District of North Kohala, 1992 & 1997

| Year | Single Family, % Fee Simple | % of All Units, Owner Occupied |
|------|-----------------------------|--------------------------------|
| 1997 | 96 | 66 |
| 1992 | 97 | 62 |

Hawaii Housing Policy Study - SMS Research, 1997

Table 9-29. Age of Housing Structures, District of North Kohala

| Type of Structure | Year Built | | | | | | | Total |
|------------------------------|------------|-------|-----------|-----------|-----------|-----------|-----------|-------|
| | No data | <1950 | 1950-1959 | 1960-1969 | 1970-1979 | 1980-1989 | 1990-1997 | |
| Single Family | 0 | 211 | 283 | 141 | 215 | 276 | 370 | 1,496 |
| Multiple Family, Condominium | 0 | 3 | 3 | 3 | 10 | 28 | 56 | 103 |

Hawaii Housing Policy Study - SMS Research, 1997

Although the population in North Kohala declined slightly in the years between 1970 and 1980, the North Kohala district continues to experience moderate increases in

§9.5.6: South Kohala

housing construction and subdivision activity. Approximately 41 per cent of the district's housing inventory was built over 30 years ago. While subdivision activity continues to occur throughout the district, most are limited to smaller subdivisions by individual landowners who seek to subdivide their large agricultural parcels into smaller parcels. Exceptions include the 113-lot Maliu Ridge subdivision and the 477-lot Kohala Ranch subdivision.

Since 1985, the Hawaii Island Community Development Corporation has assisted with the construction of ten self-help single family dwellings in Ainakea Village.

9.5.5.2 Courses of Action

- (a) Require developments that create a demand for employee housing provide for that need.
- (b) Aid and encourage programs to rehabilitate and replace the existing housing inventory, including consideration for self-help programs.

9.5.6 South Kohala

9.5.6.1 Profile

Since the 1970s, the population of South Kohala nearly doubled with every passing decade with a 1990 population of 9,140. According to the 2000 census, the population of South Kohala was 13,131 for a 44 per cent increase since 1990. Between the years 1992 and 1997, the number of housing units within the South Kohala District grew by 23 per cent.

Housing construction and subdivisions of land have been most active on the eastern side of Waimea and in Waikoloa Village. Slightly more than half of the newly created parcels in the district occurred at Waikoloa. Housing construction in Waikoloa Village increased by 589 units (including multiple-family apartments and condominiums) between the years 1970 and 1985 with a total of 2,170 units by the end of 1997.

Government agencies have participated jointly with private developers and nonprofit housing corporations to provide employee housing for the coastal resort developments in South Kohala at Waimea and Waikoloa. In addition, Boise Cascade, the original developer of Waikoloa Village, provided lots in the Waikoloa Village subdivision to its initial employees. Waikoloa Village contains a sizable amount of undeveloped, residential-zoned lands that will eventually contribute significantly to the district's housing inventory. While these residential-zoned lands will most likely be developed as market-priced homesites, approximately 300 acres of land situated makai of Waikoloa Village was dedicated by the Waikoloa Development Company to the County of Hawaii for affordable housing projects.

Table 9-33. Age of Housing Structures, District of South Kohala

| Type of Structure | Year Built | | | | | | | Total |
|------------------------------|------------|-------|-----------|-----------|-----------|-----------|-----------|-------|
| | No data | <1950 | 1950-1959 | 1960-1969 | 1970-1979 | 1980-1989 | 1990-1997 | |
| Single Family | 0 | 189 | 194 | 214 | 804 | 1,168 | 1,056 | 3,625 |
| Multiple Family, Condominium | 43 | 7 | 9 | 6 | 147 | 1,122 | 839 | 2,173 |

Hawaii Housing Policy Study - SMS Research, 1997

9.5.6.2 Courses of Action

- (a) Require developments that create a demand for employee housing provide for that need.
- (b) Aid and encourage the development of State lands for housing for all socioeconomic levels through leasehold or purchase.
- (c) Aid and encourage housing programs for low and moderate income, "gap groups" and the elderly.
- (d) County-owned land at Waikoloa Village shall be made available for the development of affordable housing.

9.5.7 North Kona

9.5.7.1 Profile

The North Kona district had the second greatest percentage increase in population over the last 30 years, from 4,832 persons in 1970 to 28,543 in 2000. The Puna District saw a slightly greater percentage increase in population during the same period.

Housing units have increased from 9,150 in 1985 to 12,254 in 1997, representing an annual growth rate of approximately 2.8 per cent.

In spite of continuing moderate growth of subdivision activity and housing construction in the North Kona district, housing problems for the low and moderate income groups have been particularly acute. In 1990, approximately 7 per cent of all households within the district reported incomes below the poverty level. In addition, these families compete with the visitor market for rental of apartment and condominium units.

State and County housing agencies have participated directly in the provisions of house and lot packages at Kealakehe Houselots, that account for 92 single family units

§9.5.8: South Kona

Table 9-36. Housing Ownership, District of North Kona, 1992 & 1997

| Year | Single Family, % Fee Simple | % of All Units, Owner Occupied |
|------|--------------------------------|-----------------------------------|
| 1997 | 93 | 39 |
| 1992 | 92 | 33 |

Hawaii Housing Policy Study - SMS Research, 1997

Table 9-37. Age of Housing Structures, District of North Kona

| Type of Structure | Year Built | | | | | | | Total |
|------------------------------|------------|-------|-----------|-----------|-----------|-----------|-----------|-------|
| | No data | <1950 | 1950-1959 | 1960-1969 | 1970-1979 | 1980-1989 | 1990-1997 | |
| Single Family | 0 | 227 | 277 | 605 | 2,330 | 2,254 | 1,187 | 6,880 |
| Multiple Family, Condominium | 226 | 5 | 0 | 410 | 2,127 | 1,792 | 818 | 5,378 |

Hawaii Housing Policy Study - SMS Research, 1997

9.5.7.2 Courses of Action

- (a) Encourage the use of innovative types of housing developments, such as cluster and planned unit developments, that take advantage of the steep topographic conditions.
- (b) Require developments that create a demand for employee housing provide for that need.
- (c) Increase affordable housing opportunities in the Kailua-Kona area.

9.5.8 South Kona

9.5.8.1 Profile

Moderate growth in both population and housing construction has occurred in the district of South Kona. Although the district is still dependent upon agriculture, some of the growth has been the result of the urban and resort growth in North Kona. This is reflected in an even distribution of new housing construction in sections from Kealahou town through Captain Cook. Subdivision activity has not occurred at equal rates to housing construction and suggests an in-filling of existing agricultural and rural parcels.

Sales of these agricultural parcels have sometimes been accompanied by the demolition of older structures that served as employee housing, farm tenant household, or low and moderate income families.

Construction of government-assisted affordable housing projects within the district were limited to two projects, Hale Hookipa (32 units) in 1976 and the Captain Cook Elderly project (21 units) in 1992. The Hawaii County Economic Opportunity Council was responsible for the development of 46 single family self-help homes on State lease land in Milolii during the past decade.

While there are some non-conforming residential lot sized subdivisions in South Kona, they are not serviced by adequate infrastructure or public services. There is the potential of in-filling that has occurred in the nonconforming subdivisions of Puna though it is anticipated to occur at a slower pace because of the distances to employment centers.

Table 9-38. Population and Households, District of South Kona, 1980 to 2000

| Year | Population | Households |
|------|------------|---------------|
| 2000 | 8,589 | Not available |
| 1990 | 7,658 | 2,591 |
| 1980 | 5,914 | 1,853 |

Economic Assessment, PKF Hawaii, January 2000
County of Hawaii Data Book, 1998
U.S. Census, 2000

Table 9-39. Existing Housing Inventory, District of South Kona, 1992 & 1997

| Year | Total | Single Family | Multiple Family, Condominium |
|------|-------|---------------|------------------------------|
| 1997 | 2,714 | 2,539 | 175 |
| 1992 | 2,254 | 2,146 | 108 |

Hawaii Housing Policy Study – SMS Research, 1997

Table 9-40. Housing Ownership, District of South Kona, 1992 & 1997

| Year | Single Family, % Fee Simple | % of All Units, Owner Occupied |
|------|-----------------------------|--------------------------------|
| 1997 | 81 | 57 |
| 1992 | 81 | 50 |

Hawaii Housing Policy Study - SMS Research, 1997

Table 9-41. Age of Housing Structures, District of South Kona

| Type of Structure | Year Built | | | | | | | Total |
|------------------------------|------------|-------|-----------|-----------|-----------|-----------|-----------|-------|
| | No data | <1950 | 1950-1959 | 1960-1969 | 1970-1979 | 1980-1989 | 1990-1997 | |
| Single Family | 0 | 257 | 203 | 197 | 586 | 706 | 590 | 2,539 |
| Multiple Family, Condominium | 74 | 1 | 2 | 1 | 16 | 32 | 49 | 175 |

Hawaii Housing Policy Study - SMS Research, 1997

9.5.8.2 Courses of Action

- (a) Encourage the use of innovative types of housing developments, such as cluster and planned unit developments, that take advantage of the steep topographic conditions.
- (b) Increase affordable housing opportunities in South Kona.

9.5.9 Ka'u

9.5.9.1 Profile

Several communities in this district were established as a direct result of the former sugar industry. Prior to the closing of its sugar operations in Ka'u in 1996, Ka'u Agribusiness was the primary employer within the district. The company, in cooperation with the Housing and Community Development Corporation of Hawaii, also facilitated the construction of housing for its employees. The closing of Ka'u Agribusiness sugar operations saw the end of these company-supported housing programs. Nevertheless, these efforts resulted in fee home ownership increasing over the years from 42 per cent of all single family residential units in 1970 to 94 per cent in 1997.

The district has a resort area at Punalu'u that encompasses a total of 432 acres. Situated between the towns of Naalehu and Pahala, the Punaluu Resort and Seamountain Golf Course complex is the only resort destination area within the Ka'u District. Currently, the only accommodation available at this complex is the 56-unit Colony One at Sea Mountain. The golf course remains in operation, but no other facilities or amenities are available. C. Brewer Properties, Inc., the original landowner, initially proposed a 300-room hotel, 410 residential units and related facilities within this resort area. Plans for the area by the current landowner are not known at this time. Future expansion of facilities at Punalu'u Resort will need to include employee housing.

This district has large non-conforming subdivisions created prior to the adoption of the present Subdivision and Zoning Codes. Building activity continues in these subdivisions. However, the subdivisions lack basic infrastructure systems such as water and, in some cases, electricity. Most of the interior roads of the subdivisions are substandard. While continued in-filling of the subdivisions may occur, the lack of adequate infrastructure will continue to present problems, and may restrain the ability to secure conventional mortgage loans for housing construction. These subdivisions are also not located near areas of employment.

Table 9-42. Population and Households, District of Ka'u, 1980 to 2000

| Year | Population | Households |
|------|------------|---------------|
| 2000 | 5,827 | Not available |
| 1990 | 4,438 | 1,530 |
| 1980 | 3,699 | 1,108 |

Economic Assessment, PKF Hawaii, January 2000
 County of Hawaii Data Book, 1998
 U.S. Census, 2000

Table 9-43. Existing Housing Inventory, District of Ka'u, 1992 & 1997

| Year | Total | Single Family | Multiple Family, Condominium |
|------|-------|---------------|---------------------------------|
| 1997 | 2,385 | 2,278 | 107 |
| 1992 | 1,876 | 1,776 | 100 |

Hawaii Housing Policy Study – SMS Research, 1997

Table 9-44. Housing Ownership, District of Ka'u, 1992 & 1997

| Year | Single Family, % Fee Simple | % of All Units, Owner Occupied |
|------|--------------------------------|-----------------------------------|
| 1997 | 94 | 55 |
| 1992 | 92 | 53 |

Hawaii Housing Policy Study - SMS Research, 1997

Table 9-45. Age of Housing Structures, District of Ka'u

| Type of Structure | Year Built | | | | | | | Total |
|------------------------------|------------|-------|-----------|-----------|-----------|-----------|-----------|-------|
| | No data | <1950 | 1950-1959 | 1960-1969 | 1970-1979 | 1980-1989 | 1990-1997 | |
| Single Family | 0 | 480 | 120 | 133 | 374 | 543 | 628 | 2,278 |
| Multiple Family, Condominium | 0 | 0 | 1 | 4 | 86 | 12 | 4 | 107 |

Hawaii Housing Policy Study - SMS Research, 1997

9.5.9.2 Course of Action

- (a) Require developments that create a demand for employee housing provide for that need.



PUBLIC FACILITIES

10.1 OVERVIEW

10.1.1 Introduction And Analysis

Public facilities are those service systems that are provided, staffed, and maintained by government to directly serve the residents of the County. Public facilities include the systems of schools, libraries, fire stations, police stations, detention and correctional facilities, refuse disposal areas, harbors, and airfields. (Harbors and airfields are further described under the Transportation Element)

These facilities are often located in larger towns or centrally situated areas that are in close proximity to the commercial, industrial and cultural activities of established communities.

The majority of public facilities that service the residents of this County are managed by the State and County. For example, the State operates the public school system, libraries, and the public hospitals. The County provides police and fire protection and solid waste disposal. Additionally, both the State and County maintain administrative offices on the island to serve the residents' needs.

It is necessary to carefully coordinate the provision of public facilities in order to use them most effectively and to maximize the effect of the public dollar. It is equally necessary to realize that the type, quality, capacity and location of facilities and services have a significant impact on the community, the people and the total environment.

10.1.2 Goal

- (a) Encourage the provision of public facilities that effectively service community and visitor needs and seek ways of improving public service through better and more functional facilities in keeping with the environmental and aesthetic concerns of the community.

10.1.3 Policies

- (a) Continue to seek ways of improving public service through the coordination of service and maximizing the use of personnel and facilities.

§10.1.4: Standards

- (b) Coordinate with appropriate State agencies for the provision of public facilities to serve the needs of the community.
- (c) Develop short and long-range capital improvement programs and operating budgets for public facilities and services.
- (d) Develop and adopt an Impact Fees Ordinance.
- (e) Capital Improvement and Operating budgets shall reflect the goals and policies of the County General Plan.
- (f) Require a six-year, long-term, capital improvements budget by County Departments and agencies that shall be reviewed for consistency with the General Plan.

10.1.4 Standards

- (a) Standards have been established in each of the four major groupings of public facilities.
- (b) The various public facilities have been categorized into education, protective services, health and sanitation, and government operations.
- (c) The following are set forth for the overall provision and maintenance of public facilities in the County.

10.2 EDUCATION

10.2.1 Introduction and Analysis

There are 39 public schools in the County with a total enrollment of 27,557 students from kindergarten through the 12th grade. The schools range in size from 169 students at Haaheo to 2,180 students at Waiakea High School. There are 17 licensed private regular education schools serving a total of 2,216 students from kindergarten through the 12th grade. The number of students from kindergarten through the 12th grade on the island, public and private school complexes combined, total 30,209 or approximately 20 per cent of the total island population.

In 1999, the Legislature of the State of Hawaii created a new educational initiative with the passage of Act 62, SLH 1999 or “The New Century Charter Schools” law. Charter schools are more autonomous with greater flexibility in decision-making. Charter schools are excluded from many State laws and department rules and regulations. However, charter schools are public schools in that they receive public funds. These schools must still meet all applicable federal, State and County requirements and are not exempt from collective bargaining, discriminatory practice laws, health and safety laws and standards, and the implementation of the Hawaii content and performance standards.

§10.2.1: Introduction and Analysis

Each charter school is responsible for selecting their own sites. If a public school has space available, a charter school may seek to enter into an arrangement with the Department of Education for the use of a portion of the school's facilities. This law allows up to 25 charter schools to be established statewide. Thus far, charter certificates have been issued for five schools.

School complexes with limited enrollment have not always been able to maximize educational opportunities in comparison with the ability of larger facilities to provide a wider scope of educational opportunities. Some older schools lack adequate parking facilities and sufficient area for expansion and some have infrastructure and traffic problems.

The Hawaii Library District is comprised of a regional library in Hilo; six community libraries in Honokaa, Kapaau, Holualoa, Kailua-Kona, Kealahou, and Naalehu (part-time); and six joint community-school libraries in Keaau, Mountain View, Pahoa, Pahala, Laupahoehoe and Waimea. Size is described by the number of volumes (books, periodicals, etc.) and range from 6,445 volumes at Holualoa to 208,065 volumes in Hilo.

Some library facilities will require improvements as the demand for learning and information increases. More up-to-date facilities are also required in some areas.

The University of Hawaii at Hilo (UHH), located in Hilo provides alternative higher educational opportunities within the University of Hawaii system through its variety of high quality certificate, baccalaureate, and masters degree programs.

The 1973 "University of Hawaii at Hilo Long Range Development Plan" was updated and revised in 1981 and again in 1996. The University of Hawaii at Hilo Long Range Development plan serves as a physical planning guide for the UHH campus. The Plan emphasizes the "spine" concept that organizes all campus structures along a main pedestrian accessway and assures that future development would continue in relation to the various existing structures. As such, new facilities would be developed towards Komohana Street. The University continues to lack adequate student and faculty housing.

Hawaii Community College provides access to higher education, and workforce training for the entire County. The College offers an extensive program of certificate and associate degree programs in technical fields as well as the first two years of a baccalaureate degree. The College also offers an extensive program of short-term training programs throughout the County. The community college serves the entire County with programs on site in the communities and utilizes distance education technologies.

The Long Range Development Plan for Hawaii Community College was approved by the Board of Regents in 1996 and calls for the construction of a new campus in Hilo

§10.2.2: Policies

mauka of Komohana Street. In West Hawaii, in addition to Hawaii Community College programs, the college is responsible for the University of Hawaii Center, through which it delivers baccalaureate and masters degree programs from other institutions in the University Center.

The Long Range Development Plan for the West Hawaii campus of the University of Hawaii was completed in 1998. The State is currently in the process of preparing an environmental impact statement for the initial phase of development of the new campus (University of Hawaii Center at West Hawaii) to be located on a 33-acre portion of a 500-acre State-owned parcel in Kalaoa, North Kona. The proposed campus, which will accommodate approximately 1,500 students upon completion, will be located mauka of the Queen Kaahumanu Highway and the Kona International Airport at Keahole.

10.2.2 Policies

Educational policies relate to the provision of facilities rather than programs, which are the province of the State. It is nevertheless recognized that the facilities and programs are the tools necessary to improve total educational service.

- (a) Encourage continuous joint pre-planning of schools with the Department of Education and the University of Hawaii to ensure coordination with roads, water, and other support facilities and considerations such as traffic and safety, and access for vehicle, bicycle, and pedestrian. Encourage master planning of present and proposed public and private institutions.
- (b) Encourage combining schoolyards with county parks and allow school facilities for afterschool use by the community for recreational, cultural, and other compatible uses.
- (c) Encourage joint community-school library facilities, where a separate community library may not be feasible, in proximity to other community facilities, affording both pedestrian and vehicular access.
- (d) Encourage implementation of the Department of Education's 'Educational Specifications and Standards for Facilities.'
- (e) Encourage the Hawaii State Library System to seek alternate sites for public libraries located on the campuses of public schools.

10.2.3 Standards

- (a) In proposed communities, sufficient acreage shall be reserved for school facilities. Sites shall be free from flooding and drainage problems, excessive slope and shall incorporate appropriate street and driveway design and location to minimize traffic interference, pedestrian hazard, and enable safe and easy access for vehicles, bicycles and pedestrians.

§10.2.4.2: SOUTH HILO

10.2.4.1.2 Courses of Action

- (a) Improve existing school complexes to meet the standards established by the State Department of Education.
- (b) School facilities should be made available to the community for recreation and other compatible uses during after school hours.
- (c) Encourage the Department of Education to plan and develop school facilities as the need arises.
- (d) Encourage improvements to pedestrian access between the village of Pahoa and the school and library facilities.

10.2.4.2 SOUTH HILO

10.2.4.2.1 Profile

The public school complexes in the South Hilo district includes two high schools, three intermediate and eight elementary schools. One of the intermediate schools is a combined elementary-intermediate facility serving the kindergarten through the eighth grade level. The school enrollment of South Hilo is about 10,339 students.

The Hilo High School complex is comprised of Hilo High School, Kalaniana'ole Elementary and Intermediate School, Hilo Intermediate School, DeSilva Elementary School, Haaheo Elementary School, Hilo Union Elementary School, Queen Kapiolani Elementary School, Kaumana Elementary School, and Keaukaha Elementary School and serves about 5,576 students.

The Waiakea High School complex is comprised of Waiakea High School, Waiakea Intermediate School, Waiakeawaena Elementary School, and Waiakea Elementary School and has an enrollment of 4,763 students. The facility serves students from the Waiakea, Keaau and Mt. View intermediate schools. A new high school in Keaau opened in 1999. Upon completion of all phases, the new high school will serve the students from the Keaau complex.

The Waiakea Intermediate School presently accommodates 6th grade students from the Waiakea Elementary and Waiakeawaena Elementary facilities to relieve the overcrowded student population. All three schools have an enrollment of 2,583 students.

Traffic congestion occur in the area of the Waiakea High-Intermediate-Elementary School and the Hilo High-Intermediate-Union School-Haili Christian (private) complexes where students commute to and from school twice daily at nearly the same time. The areas surrounding some school complexes have practically no sidewalks or curb separations for the students' ease of access and safety.

The regional library, with a collection of 208,065 volumes, is located in Hilo and is the administrative center for all the branch libraries in Hawaii County. Although conve-

§10.2.4.3: NORTH HILO/HAMAKUA

- (g) Encourage the implementation of existing State and University of Hawaii plans for the continued development of the "Research and Technology Park" on the campus of the University of Hawaii at Hilo.

10.2.4.3 NORTH HILO/HAMAKUA

10.2.4.3.1 Profile

The Laupahoehoe High and Elementary School complex serves 250 students from kindergarten through the 12th grade level. The existing facility is adequate, as enrollment has been relatively stable due to the aging of the district's population.

The physical disadvantages of the Laupahoehoe School facility include the steep grade and narrow access from the highway, the lack of adequate pedestrian walkways leading to the school, and the abruptness of the road junctions.

The Honokaa High School Complex is comprised of Honokaa High School, Waimea Elementary and Intermediate School, Paauilo Elementary and Intermediate School, Honokaa Elementary School, and Waikoloa Elementary School and serves 3,258 students from kindergarten through the 12th grade level. Honokaa High School accommodates students from South Kohala as well as from the Hamakua district.

A traffic problem exists within the Honokaa School complex due to a through-street bisecting the campus. Vehicular and pedestrian problems also exist in Paauilo.

The Laupahoehoe library is a joint community-school facility housing 20,277 volumes. The community facility in Honokaa has 16,705 volumes.

10.2.4.3.2 Courses of Action (North Hilo)

- (a) Improve pedestrian and vehicular access to the Laupahoehoe and Hamaku School complexes.
- (b) Encourage continual improvements to existing educational facilities.

10.2.4.3.3 Courses of Action (Hamakua)

- (a) Encourage continual improvements to existing educational facilities.
- (b) Encourage traffic re-routing to resolve school traffic problems.
- (c) Implement the Honokaa school campus master plan.
- (d) Encourage expansion of the present library facility and services.

10.2.4.4 NORTH AND SOUTH KOHALA

10.2.4.4.1 Profile

The Kohala High and Elementary School complex is comprised of Kohala High and Intermediate School and Kohala Elementary School. The complex services all of North Kohala's 994 student enrollment. The existing facilities are sufficient for the district's needs.

The South Kohala district public school is located in Waimea and accommodates an enrollment of 1,195 students from kindergarten through the 8th grade level. High school students commute a distance of 16 miles to Honokaa. An additional elementary school has been constructed and is in operation at Waikoloa.

Department of Education is developing a master plan for Waimea School that provides for a new elementary school, an expanded intermediate school, improved access and parking areas.

The Bond Memorial Library has a collection of 16,435 volumes. The Parker Memorial community-school library, located adjacent to Waimea school is the second largest public library on the island. The facility has a collection of 43,309 volumes.

10.2.4.4.2 Courses of Action (North Kohala)

- (a) Encourage the expansion of the public school and library facilities as needs arise.
- (b) Encourage the Hawaii State Library System to establish a public library separate from the school facility.
- (c) Encourage continual improvements to existing educational facilities.

10.2.4.4.3 Courses of Action (South Kohala)

- (a) Encourage the expansion of the public school and library facilities as needs arise.
- (b) Encourage continual improvements to existing educational facilities.
- (c) Encourage the installation of walkways to and around schools and street crossing facilities for pedestrian safety.
- (d) Encourage the development of State and private higher educational facilities in West Hawaii.
- (e) Support the development of an intermediate or middle school in Waikoloa.
- (f) Encourage the Hawaii State Library System to establish a public library in Waikoloa.
- (g) Encourage the State Department of Education to explore the feasibility of establishing a high school in the South Kohala district.

§10.2.4.5: NORTH AND SOUTH KONA

10.2.4.5 NORTH AND SOUTH KONA

10.2.4.5.1 Profile

The Kona public school system is comprised of the Konawaena and Kealakehe High School complexes.

The Konawaena High School complex includes Konawaena High School, Konawaena Middle School, Konawaena Elementary School, Hookena Elementary School, and Honaunau Elementary School and serves 2,882 students.

Ho'okena Elementary/Intermediate and Honaunau Elementary/Intermediate kindergarten to 8th grade may be transferred to the Konawaena complex due to extremely limited program offerings as only about 364 students are presently enrolled. The construction of a new Konawaena Elementary School was recently completed.

The Kealakehe High School complex is comprised of Kealakehe High School, Kealakehe Intermediate School, Holualoa Elementary School, Kealakehe Elementary School, and Kahakai Elementary School. The Kealakehe High School complex serves 4,063 students.

Kahakai Elementary School opened in 1982 to relieve the overcrowded enrollment at Kealakehe Elementary School. However, the Kealakehe High School complex continues to experience student population growth problems. It has developed separate facilities for the kindergarten through 6th grade level and 7th through 8th grades. The new Kealakehe High School will serve grades nine through twelve.

The Holualoa Library, located near the school, has a collection of 6,445 volumes; Kealakekua library has 28,467 volumes and the Kailua-Kona branch library has 47,955 volumes. The Kailua-Kona library is inadequate in size to serve the needs of the area.

The State is currently in the planning stages for the University of Hawaii Center at West Hawaii (UHCWH). The new University campus will initially be located on a 33-acre portion of a larger 500-acre site on the mauka side of the Queen Kaahumanu Highway, directly mauka of the Kona International Airport at Keahole. Upon completion, the new campus is anticipated to accommodate 1,500 students. For administrative purposes, the UHCWH will be assigned to the Hawaii Community College at Hilo.

10.2.4.5.2 Courses of Action (North Kona)

- (a) Encourage expansion of the Holualoa school complex to meet school district needs.
- (b) Encourage the State Department of Education to add facilities as the need arises.

- (c) Improve basic school facilities to meet current standards.
- (d) Encourage construction of a new library facility to serve the Kailua-Keauhou area.

10.2.4.5.3 Course of Action (South Kona)

- (a) Improve basic school facilities to meet current standards.

10.2.4.6 KA'U

10.2.4.6.1 Profile

The Ka'u High School complex is comprised of Ka'u High School, Pahala Elementary School, and Naalehu Elementary and Intermediate School, and serves a total enrollment of 810 students from kindergarten through the 12th grade level. The overall physical facilities at Naalehu and Pahala are adequate to serve the district needs.

Pahala and Naalehu both have adequate library facilities. Pahala is a joint community-school library facility located within the school complex and houses a collection of 19,564 volumes. Naalehu's facility is located behind the local post office and houses a collection of 7,631 volumes.

10.2.4.6.2 Courses of Action

- (a) Encourage continual improvements to existing educational facilities.
- (b) Encourage the State Department of Education to plan a K-8 School at Ocean View.

10.3 PROTECTIVE SERVICES

10.3.1 Introduction and Description

Protective services consist of fire, police, detention and correctional facilities, civil defense, the Coast Guard, and National Guard armories.

Fire and Emergency Medical Services

There are presently 20 regular fire stations, 22 volunteer fire stations and 1 federal fire station located throughout the island. The County is proposing a fire station in the Kalaoa-Mauka area. The Pohakuloa fire station is a federally operated facility. The regular fire stations provide 24 hour fire fighting and emergency medical services. The Waiakea and Kailua-Kona stations provide rescue services, the Kaumana station provides hazardous materials response and the South Kohala station provides air medical services.

§10.3.1: Introduction and Description

The County has contracted with the State Department of Health for emergency medical ambulance services. All fire department personnel who provide basic and advanced life support are licensed or certified as required by State law. In general, emergency medical services account for 75 per cent of all incidences. Fire fighting comprises another 5 per cent, and the balance is divided between rescue, hazardous substances, special services, and natural disasters.

Police

Each of the eight districts is served by a main police station. There are four substations (Pahoa, Mauna Lani Fire Station, Captain Cook and Pahala).

Based on population, the islandwide average is about 2.5 officers per 1,000 residents. By district, Puna is significantly below this average (1.56 per 1,000), while North Hilo has a significantly higher ratio of 7.05 per 1,000. The other seven districts are close to the island average.

Detention and Corrections

The State Department of Public Safety operates correctional facilities for the confinement of pretrial inmates and convicted offenders, and intake service centers for the supervision of offenders. An array of rehabilitative programs is available through the correctional facilities and intake service centers. The Hawaii Intake Service Center and the Hawaii Community Correctional Center) and its annex are located in Hilo. A minimum-security facility (Kulani Correctional Facility) is located at the end of Kulani Stainback Highway on the lower slopes of Mauna Loa. Police facilities in Hilo and Kealahou also have holding cells for overnight detention. The construction of a new 18-cell detention center at the Hilo Police Station is expected to be completed in 2002.

Civil Defense

The Hawaii County Civil Defense Agency directs and coordinates the development and administration of the County's total disaster preparedness and response program to ensure prompt and effective action when natural or man-caused disaster threatens or occurs anywhere in the County. Currently, the County does not have a database of natural disasters or events and cannot determine the time and date of an event, the extent of the damage, or recommend mitigation measures. A database could assist the State and County in identifying where funding for improvements should be directed.

Coast Guard

The United States Coast Guard provides ocean rescue and navigation services. The Coast Guard Patrol cutter Kiska is stationed at Hilo Harbor, and a Loran navigational transmitting station is located at Upolu Point.

National Guard Armories

National Guard armories are State and Federally funded facilities housing the State militia. There are four armories in Hilo (Headquarters), Honokaa, Kealahou, and Keaau. The Pahala armory is under the jurisdiction of the State. In addition to housing the militia, the facilities are also used by the community for public service functions. In time of emergency, the National Guard, at the call of the Governor, can assist with transportation, evacuation, communication, crowd control, security, and emergency electrical power.

The scattered and small population centers on the island generally make protective services difficult in terms of effectively providing fire and police coverage. Some of the small centers are growing in population and some are already stabilized or decreasing, but both categories need strengthening to better serve the public. Rural areas are handicapped by the lack of an adequate hydrant system that lessens the effectiveness of fire protection service. Furthermore, some facilities are in sub-standard physical condition. Expenditures for these services will increase as the population grows and the population becomes increasingly dispersed.

Enhanced 911 is a three-digit telephone number that provides residents with direct access to an emergency answering center located at the Hawaii County Police Department Dispatch Center. Every resident or visitor to the island with access to a telephone could request assistance by dialing 911, regardless of location, time of day, or emergency type.

Computer-aided Dispatch (CAD) is the system being utilized by both the fire and police departments in its quest to better serve the Big Island. This CAD technology will greatly enhance the abilities of both departments in obtaining the goal of fully automating the process of call taking, dispatching, and records management in providing a highly efficient system for response to emergency incidents.

10.3.2 Policies

- (a) Development of police and fire facilities should entail joint use structures whenever feasible.
- (b) The establishment of a fire/police facility shall consider site size and locations that permit quick and efficient vehicular access.
- (c) Development of volunteer fire facilities with proper planning to be replaced or to co-exist with full time Fire/EMS personnel.
- (d) Police headquarters shall be near the geographic center of the service area and near concentrations of commercial and industrial use.
- (e) Stations in outlying districts shall be based on the population to be served and response time rather than on geographic district.

§10.3.3: Standards

- (f) Correctional facilities should emphasize rehabilitation. Establish additional rehabilitation and counseling centers, including drug and behavioral treatment facilities in secure settings, when necessary.
- (g) Encourage the further development and expansion of community policing programs and neighborhood and farm watch programs in urban, rural and agricultural communities.
- (h) The County of Hawaii Emergency Operations Center shall be improved to meet the requirements set forth by federal and State regulations.
- (i) Maintain an appropriate number and type of emergency helicopters, including appropriate aero medical capabilities.
- (j) Mitigate hazards through the preparation of disaster assessment reports and appropriate follow-up on the assessment recommendations.
- (k) Educate the public regarding disaster preparedness and response, especially proper responses for sudden impact hazards.
- (l) Encourage the State to evaluate the disaster shelters' ability to withstand various natural disasters.
- (m) Consider the proximity to fire stations in approving any rezoning to permit urban development.
- (n) The Fire Department, in cooperation with other related governmental agencies and the involved land owners, shall prepare a fire protection and prevention plan for forest reserves and other natural areas.

10.3.3 Standards

- (a) 2.5 police officers per 1,000 resident population.
- (b) Fire stations within five miles of concentrated settlement areas.
- (c) First response emergency medical service within eight minutes of concentrated settlement areas (alternative means, such as training police officers or volunteer fire personnel, could be available to provide first response).

10.3.4 Districts

10.3.4.1 PUNA

10.3.4.1.1 Profile

Pahoa has a fire/EMS operation that serves the Pahoa-Paradise Park and Kalapana-Kapoho areas. Thirteen miles away in Keaau is a 24-hour fire/EMS facility. Hawaiian Beaches, Hawaiian Paradise Parks, Hawaiian Acres, Fern Acres, Fern Forest and Waa Waa subdivisions and Volcano Village have 24-hour volunteer facilities.

The police station headquarters for Puna is housed in the Keaau public office complex covering the entire district. A district substation is located in Pahoa.

10.3.4.1.2 Courses of Action

- (a) A review of the possibility of 24-hour fire and emergency medical service for the entire district should be conducted and expansion of the public office facilities should be considered in accord with district needs.
- (b) Police services and facilities should be expanded to adequately meet the needs of the district.

10.3.4.2 SOUTH HILO**10.3.4.2.1 Profile**

The County's Fire Administration is located in the County Building. There are four 24-hour full time substations within the city at Central, Waiakea, Kaumana, and Kawaihani. Central Fire Station is a full-time fire/EMS operation; Waiakea Fire Station is a fire/EMS/Rescue operation; Kawaihani Fire Station is a fire/EMS operation; and Kaumana Fire Station is a fire/EMS/Hazardous Materials operation. A 24-hour, on-call volunteer facility is located in Pepeekeo. Communities outside Hilo are about two minutes per mile away from service. Parking is inadequate at the Waiakea and Kawaihani fire stations and access problems exist at the Central, Kaumana and Kawaihani stations. Plans are being formulated for a centralized fire/rescue/hazardous materials training facility.

The combined police headquarters for Hilo and the County is located in the Hilo Public Safety Building on Kapiolani Street. The Hawaii Community Correctional Center is operated by the State Department of Social Services and Housing, has a capacity of 24. The State's Kulani Correctional Facility has a capacity of 90. As a minimum-security facility, it has no perimeter walls or fences and is primarily a rehabilitation center.

The County of Hawaii Emergency Operations Center, the Civil Defense office, is located in the Hawaii Public Safety Complex on Kapiolani Street in Hilo.

10.3.4.2.2 Course of Action

- (a) Expansion of Police, Fire, and emergency medical facilities should be considered in accordance with district needs.

10.3.4.3 NORTH HILO**10.3.4.3.1 Profile**

Protective service facilities are located at Laupahoehoe. Fire protection consists of a 24-hour fire/EMS service supplemented by on-call volunteers. Police services are also available.

§10.3.4.4: HAMAKUA

10.3.4.3.2 Course of Action

(a) Service facilities shall be improved to meet needs.

10.3.4.4 HAMAKUA

10.3.4.4.1 Profile

The district's fire facility is located in Honokaa and provides 24-hour fire/EMS service. A volunteer station is located in Paauilo.

The district police headquarters is also located in Honokaa within the government office center.

10.3.4.4.2 Course of Action

(a) Service facilities shall be improved to meet needs.

10.3.4.5 NORTH KOHALA

10.3.4.5.1 Profile

Kapaau is the site of a full-time fire/EMS operation supplemented by 15 volunteers.

The police station adjoins the court building at Kapaau.

10.3.4.5.2 Course of Action

(a) Service facilities shall be improved to meet needs.

10.3.4.6 SOUTH KOHALA

10.3.4.6.1 Profile

A 24-hour fire/EMS facility is located in Waimea, with an eight hour one-man facility located at Kawaihae. South Kohala is a full-time fire/EMS/Hazardous Materials and Aero Medical operation. Waikoloa is a full-time fire/EMS operation. 24-hour, on-call volunteer facilities are located in Waikoloa Village, Kona Village Resort and Kohala Ranch Subdivision.

The South Kohala District Substation is located in Kalahuipuaa off the Queen Kaahumanu Highway. Police service is available from a public office complex shared with the Court and State government agencies located in Waimea.

10.3.4.6.2 Course of Action

(a) Service facilities shall be improved to meet needs.

10.3.4.7 NORTH AND SOUTH KONA

10.3.4.7.1 Profile

A 24-hour fire facility is located in Kailua-Kona with fire/EMS/Rescue capabilities. A full-time fire/EMS operation is located at Keauhou and a full-time fire/EMS operation is located in the Captain Cook public office center. Twenty four-hour, on-call volunteer services are located in Kalaoa Mauka, Milolii Village and Kona Paradise Subdivision. There is also a proposed fire station in a subdivision at Kaupulehu. The main police facility is located in Kealakehe, and substations are located in Captain Cook, Kailua-Kona and Keauhou.

10.3.4.7.2 Course of Action

(a) Service facilities shall be improved to meet needs.

10.3.4.8 KA'U

10.3.4.8.1 Profile

There is a 24-hour fire/EMS operation in Naalehu and a 24-hour facility located in Pahala. Twenty-four hour, on-call volunteer services are provided within Ocean View, Discovery Harbour, Naalehu and Pahala.

A newly built police station in Naalehu serves the entire Ka'u district. The Ka'u District substation is located in Ocean View.

10.3.4.8.2 Courses of Action

(a) Fire protection and emergency medical services for Ocean View, Naalehu and Pahala shall be encouraged.

(b) Consideration shall be given to a joint police-fire facility.

10.4 GOVERNMENT OPERATIONS

10.4.1 Introduction and Analysis

This section discusses facilities housing various governmental agencies and baseyard operations. However, many public facilities are either covered or referred to in other elements of the General Plan.

Public office centers consist of a building or complex of buildings that house governmental agencies. Such centers exist in Hilo, Honokaa, Captain Cook, Kailua, Naalehu, Keaau, Waimea and Kapaau.

§10.4.2: Standards

Baseyards are the operational, storage and maintenance centers for public works services such as those provided by the road and water departments. These baseyards also serve as agency field offices.

The "one roof" or "one stop" concept of housing governmental agencies centralizes services and maximizes the utilization of land and capital expenditures.

10.4.2 Standards

- (a) Public office center sites shall satisfy modern and reasonable requirements of accessibility and compatibility with the surrounding neighborhood.
- (b) The multipurpose concept of flexibility to satisfy changing requirements should be part of the design for public buildings.
- (c) Architectural and landscaping shall reflect as much as possible the community's attributes.

10.4.3 Districts

10.4.3.1 PUNA

10.4.3.1.1 Profile

The Keaau public office complex serves the entire district and houses police, fire and courtroom services. No other State agencies are located here due to the district's relatively close proximity to the Hilo complex. Post office facilities are located at Keaau, Kurtistown, Mt. View, Pahoa and the Volcano area.

The County maintains a public works baseyard in Kurtistown and a State Highways baseyard is located in Mt. View. The State facilities appear adequate. The County baseyard may be relocated if land becomes available.

10.4.3.1.2 Course of Action

- (a) Expand/improve facilities as necessary.

10.4.3.2 SOUTH HILO

10.4.3.2.1 Profile

The center of Federal, State and County government operations is located in Hilo. State and County buildings are situated on part of a 40-acre commercial area called Project Kaiko'o.

The Hawaii County building in Hilo houses many Counties agencies including the Department of Public Works, Finance Department, Planning Department, Fire Administration, Elections, Parks and Recreation, Research and Development, County Clerks,

§10.4.3.3: NORTH HILO

Legislative Auditor, Data Systems, and other departments and divisions. However, the County is currently in the process of developing plans to move several departments currently located in the Hawaii County building to a large commercial area in the old Kaiko'o Shopping Center. The State building headquarters State agencies with the exception of the Department of Transportation, although some of the State agencies, such as the Health Department, Department of Social Services and Housing, and the Department of Education, have other bases of operation.

The State Highways Division office and baseyard are located in the Kanoelehua industrial area and the Airports and Harbors Divisions are located at their respective terminals. The County Department of Public Works baseyard is located in the Schultz Siding area and requires area improvements.

Postal facilities are located in Hilo, both downtown and at the airport, Honomu, Pepeekeo, Papaikou, and Hakalau.

10.4.3.2.2 Courses of Action

- (a) Consolidate government offices in a public office center.
- (b) Improvements to County baseyard facilities shall be undertaken.

10.4.3.3 NORTH HILO

10.4.3.3.1 Profile

Police and fire facilities are located in Laupahoehoe.

Postal facilities are located in Laupahoehoe, Ninole, Ookala, and Papaaloa.

10.4.3.3.2 Course of Action

- (a) Expand/improve facilities as necessary.

10.4.3.4 HAMAKUA

10.4.3.4.1 Profile

The State Highways Division and County Department of Public Works both have baseyards in Honokaa. The County facility is of sufficient size to accommodate present and future needs while the State baseyard is inadequate.

The public office complex houses the fire station, police station, court building, library, and State agencies. The various agencies within the complex are each housed in separate buildings that result in an uneconomical use of the site.

Postal facilities are located in Honokaa, Kukuihaele, Paauhau, Pohakuloa, and Paauilo.

§10.4.3.5: NORTH KOHALA

10.4.3.4.2 Course of Action

- (a) Multi-use buildings housing public office center facilities shall be encouraged in overall improvements and expansion plans.

10.4.3.5 NORTH KOHALA

10.4.3.5.1 Profile

The courthouse, police, and fire stations, library and hospital are located in Kapaau. A State Highway baseyard site is located in the Puuepa-Kokoiki Homestead area and the County Public Works baseyard is located in Kapaau. Postal facilities are located in Hawi and Kapaau.

10.4.3.5.2 Course of Action

- (a) Expand/improve facilities as necessary.

10.4.3.6 SOUTH KOHALA

10.4.3.6.1 Profile

Governmental operations, including the district court, are conducted in the public office center in Waimea Village. Postal facilities are located in Kamuela, Waikoloa, and Kawaihae.

Storage and maintenance functions are situated at the 2.4-acre State Highway baseyard in Waimea Homesteads. A three-acre County baseyard is also located in Lalamilo.

10.4.3.6.2 Courses of Action

- (a) Expand/improve facilities as necessary.
- (b) A civic center site shall be reserved at Waikoloa.

10.4.3.7 NORTH AND SOUTH KONA

10.4.3.7.1 Profile

Kona's public office centers are located in the Captain Cook village area, and Kailua. Fire and State agencies are individually housed on the four-acre Captain Cook site. The Court is housed in the old Kona Hospital. The nearest police station is situated in Kealakehe.

One State baseyard is located in Kaloko, with another at Honaunau. The County baseyard in Captain Cook adequately serves the needs of the district.

Post offices are at Captain Cook, Holualoa, Honaunau, Kailua, Keauhou, and Kealakekua.

10.4.3.7.2 Courses of Action (North Kona)

- (a) Expansion plans for the Kona public office center shall be undertaken.
- (b) Consolidate County offices in one public office center.
- (c) Designate a second urban center in West Hawaii to facilitate government services and centralize facilities.
- (d) Provide services in West Hawaii as is feasible.

10.4.3.7.3 Courses of Action (South Kona)

- (a) Expansion plans for the Kona public office center shall be undertaken.
- (b) Consolidate county offices in one public office center.
- (c) Provide services in West Hawaii as is feasible.

10.4.3.8 KA'U**10.4.3.8.1 Profile**

The courthouse and State agencies are located in Naalehu and adequately serve the needs of the district. The new police station in Kaunamano Homesteads adequately serves the needs of the district.

The State baseyards in the Kaunamano Homesteads area and Manuka adequately serve the needs of the district. The County Public Works baseyard in Waiohinu is adequate.

Postal facilities are located in Naalehu, Pahala, Ocean View, and the Hawaii Volcanoes National Park area.

10.4.3.8.2 Course of Action

- (a) Expand/improve facilities as necessary.

10.5 HEALTH AND SANITATION**10.5.1 Introduction and Description**

The County is responsible for the general welfare of its residents and must continue to make every effort to ensure that adequate health services are provided. Actual planning of health programs and facilities is the direct administrative responsibility of the State. Under this section, hospitals and related facilities, solid waste disposal facilities, and cemeteries will be discussed. The latter two are County administered.

Hospitals and Related Facilities

Currently there are six licensed hospitals operating on the Big Island: Hilo, Kona, Honokaa, North and South Kohala, and Ka'u. Together these six hospitals make up the Hawaii County Network. The island's geography and population distribution determine the roles played by each community hospital. The current roles are:

| | |
|---------------------------------|---|
| Hilo | Major referral center and key support for shared services, emergency services, specialty care, and long-term care |
| Kona | Medical and surgical care, some specialty care, emergency care, out patient, and long-term care |
| Honokaa | Long-term care |
| North and South Kohala and Ka'u | Emergency services, uncomplicated deliveries, short medical stays, and primarily long-term care |

State Department of Health
North Hawaii Community Hospital

Primary healthcare is defined as "non-bed related diagnosis, treatment and prevention services; includes general medical care in a doctor's office or outpatient clinic, emergency medical care, diagnostic radiology and clinical laboratory services, and continuing care of the chronically ill and those requiring rehabilitation." Secondary healthcare is defined as "inpatient diagnostic and therapeutic services provided in an acute care hospital to patients who stay overnight and at least 50 per cent of whom leave less than 30 days following admission."

In addition, two private intermediate care facilities, Life Care Center and Hale Anuenue Restorative Care Center, are located in Hilo. Private practitioners are located throughout the island. As the number of elderly increases, there will be a greater need for assisted living, skilled nursing, and intermediate care facilities in the various districts.

The County's Fire Department provides emergency medical services. Five of the six hospitals provide emergency room services.

The County's Fire Department also provides ambulance service from the Captain Cook, Central, Honokaa, Kailua-Kona, Keaau, Waimea, Kawaiiani, Pahoa, Naalehu, Keauhou, South Kohala, North Kohala, Waikoloa, Volcano and Ocean View Fire Stations. The County's ambulances are first response units for these service areas while the ambulances at the Kohala and Ka'u hospitals are the first response units for their respective area.

The majority of non-institutional health services are located in Hilo. However, adult boarding homes are also located in Hilo, Hamakua, Waimea, and Puna. Honolulu's St. Francis Hospital operates a renal dialysis facility at Hilo Hospital and plans another for Kona.

Solid Waste Management Facilities

Solid waste management has significant effects on the health, aesthetic, and land use characteristics of a community. The County maintains two landfill sites, one active landfill in east Hawaii in Hilo, and another active landfill in West Hawaii at Puuanahulu. In addition, there are twenty-one solid waste transfer sites throughout the island.

The management of solid waste on the island has undergone significant changes in the past few decades. Prior to the early 1970's, solid waste disposal was handled through an informal network of open dumpsites near major residential towns around the island. From the mid-1970's, a system of residential transfer stations was developed and updated landfill operations were implemented at the Hilo and Kailua landfill. In 1994, a new landfill was constructed at Puuanahulu in compliance with Federal environmental and health standards. That same year, the landfill in Kailua was closed and continues to be monitored.

Currently, residents take their solid waste to any one of 21 transfer stations around the island. The solid waste is then hauled to either the Hilo or Puuanahulu landfills. In some areas, residents pay private haulers to pick-up their refuse from their residences for disposal at a landfill.

The County's solid waste system continues to evolve to meet the requirements of State and Federal regulations and the public. For example, the State of Hawaii's Integrated Solid Waste Management Act includes waste reduction goals of 25 per cent by 1995 and 50 per cent by 2000. Both the County and the State as a whole has failed to meet the desired goal of 50 per cent by 2000. To reach this goal of 50 per cent, the County needs to implement an integrated solid waste management system. However, there are barriers to implementing this solid waste management system.

- A recycling ethic is not yet firmly rooted among Hawaii's people and businesses.
- Waste disposal appears to be cheap and easy. The actual cost of dumping is not readily evident to people.
- The high cost of operating a recycling business in Hawaii.
- Local recycled materials markets are underdeveloped, and access to out of state markets are expensive due to Hawaii's isolated geography.

Overcoming these barriers is possible but it will require a commitment of energy and resources from the public and private sectors. In August of 1993, the Department of Public Works published an Integrated Solid Waste Management Plan for the County of Hawaii. The major objective of the plan was to "...provide a foundation for decision making that would guide solid waste management on the island." It was not intended to provide specific details on the day to day operation of solid waste management programs, but rather to provide assistance to the County administration and Council as to the type of programs to fund, implement, and administer.

§10.5.1: Introduction and Description

Each County must update its Integrated Solid Waste Management Plan in the near future. Hawaii County's update is still under review. This update will address several major issues facing the County at this time.

Some issues examined by this plan are the closure of the South Hilo Landfill, user fee approach, and siting of rural transfer stations. The Hilo landfill is an unlined landfill that was permitted to continue operations until October, 1998. The State Department of Health is reviewing the application for a five-year extension of the Hilo landfill for additional time to develop an alternative means of handling the solid waste from East Hawaii. Options such as a material recovery facility/long haul transfer station that would minimize solid waste to be hauled and disposed of at the Puuanahulu landfill; or the development of new technologies to manage east Hawaii refuse would be considered.

Tipping fees account for 35 per cent of revenue to operate the Solid Waste Division. The remainder of the funds needed to operate the division comes from the general fund. Various options have been studied. The most recent is a Pay-As-You-Throw concept where each resident and business is assessed a fee based on the amount of solid waste disposed. This program would help to promote greater recycling and diversion to minimize the amount of refuse being disposed of at landfills. However, the most effective means of making a Pay-As-You-Throw program work is to implement curb-side pickup. The question becomes how best to transition from a public accustomed to self-hauling to a transfer station, to paying a private hauler or increase taxes for the County to commence this service.

Solid waste transfer stations normally were sited at a pre-existing old community open dump. These sites were located based on population centers 30-40 years ago. However, with the development of new subdivisions and the expansion of existing communities, some of the existing transfer stations may no longer be located at the most convenient site to serve the majority of residents.

The illegal disposal of solid waste continues to be a problem throughout the County. Illegal dumping is a visual nuisance to residents adjacent to these dumps as well as a health hazard to the rest of the community. Illegal dumping lacks the necessary safety precautions that prevent hazardous materials and pollutants from contaminating soil and ground water sources.

Cemeteries

As of July 1, 2000, management of County cemeteries was transferred from the County's Department of Public Works to the Department of Parks and Recreation. The County has 21 public cemeteries. The size of cemeteries ranges from one-half acre to

14 acres with the average size in rural areas being two acres. There are several private cemeteries, notably the Homelani and the Chinese cemetery in Hilo, and the Mauna Kea Memorial Park in Kaieie, Papaikou.

10.5.2 Policies

- (a) Encourage the development of new health care facilities or the improvement of existing health care facilities to serve the needs of Hamakua, North and South Kohala, and North and South Kona.
- (b) Develop and implement a cemeteries master plan for the siting of future cemeteries.
- (c) Appropriately designed and cost-effective solid waste transfer station sites shall be located in areas of convenience and easy access to the public.
- (d) Encourage the State to continue operation of the rural hospitals.
- (e) Encourage the establishment or expansion of community health centers and rural health clinics.
- (f) Continue to encourage programs such as recycling to reduce the flow of refuse deposited in landfills.
- (g) Investigate the possibility of developing new landfill sites on the island.
- (h) Encourage the full development and implementation of a green waste recycling program.

10.5.3 Standards

- (a) Sanitary landfill sites for refuse disposal shall be established in accordance with the needs of communities and the State Department of Health and U.S. Environmental Protection Agency's rules and regulations.
- (b) Hospitals should be on sites capable of handling moderate expansion of facilities. Quiet surroundings, convenient and adequate access, and compatibility with adjoining uses shall be required.
- (c) Hospitals shall be served by a public sewerage system or have self-contained sewerage systems.
- (d) Hospital solid waste shall be disposed of in accordance with all Federal, State, and County laws and regulations.
- (e) Private and public cemeteries shall be compatible with surrounding land uses and provided with adequate access and drainage systems.

10.5.4 Districts

10.5.4.1 PUNA

10.5.4.1.1 Profile

Health

Health services in the district of Puna are provided by privately operated clinics in Pahoehoa and Keaau.

Solid Waste

Solid waste transfer stations are located in Pahoehoa, Kalapana, Volcano, Glenwood and Keaau.

Cemeteries

There are three public cemeteries serving the district at Kaimu, Malama-Ki and Kehehehe. The latter has been covered by a lava flow. Use and maintenance of these sites is on a limited basis.

10.5.4.1.2 Courses of Action

- (a) Maintenance of cemetery sites shall be improved.
- (b) Provide additional solid waste transfer stations as the need arises.

10.5.4.2 SOUTH HILO

10.5.4.2.1 Profile

Health

Hilo Medical Center (HMC) is a secondary healthcare facility that was completed in 1985. HMC is intended to provide major secondary care for the Puna, South Hilo, and North Hilo Districts. Also located within the Hilo District is the Department of Health's and Department of Social Services and Housing district offices that provide public health and health care services. A variety of voluntary agencies and organizations providing health education, healthcare support, nutrition, and other specialized services are located in Hilo.

10.5.4.2.2 Solid Waste

The County has its East Hawaii landfill waste disposal system in operation at the former dump site in Hilo. Unfortunately, the impending closure of the Hilo landfill

§10.5.4.3: NORTH HILO

site will cause substantial problems unless an alternative East Hawaii site is found. The impending closure of the landfill site is due to the high costs necessary to retrofit the existing landfill to conform to current EPA and State pollution regulations. If an East Hawaii alternative cannot be found, the island's only landfill will be at Puuanahulu. Transfer station sites supplementing the landfill system have been built in Hilo, Papaikou and Honomu.

Cemeteries

There are three public cemeteries in South Hilo: a Veteran's Cemetery (two sites consolidated into a single location at Ponahawai), a cemetery in Waiakea-Uka and Alae Cemetery, located between Wainaku and Paukaa.

10.5.4.2.3 Courses of Action

- (a) Improvement and expansion of hospital facilities shall be undertaken as the need arises.
- (b) Expansion of existing cemeteries or creation of new sites shall be undertaken.

10.5.4.3 NORTH HILO

10.5.4.3.1 Profile

Health

Healthcare services in the North Hilo district are extended through services located in South Hilo and South Kohala.

10.5.4.3.2 Solid Waste

The solid waste disposal in Laupahoehoe is handled by a solid waste transfer station.

Cemeteries

There are two public cemeteries at Piha and Kihalani, both of which are not adequately maintained.

10.5.4.3.3 Course of Action

- (a) Maintenance of cemeteries shall be improved.

10.5.4.4 HAMAKUA

10.5.4.4.1 Profile

Health

The old Honokaa Hospital built in 1951 was replaced in 1995 with a long term care facility, renamed Hale Ho`ola Hamakua and administered by the Hawaii Health Systems Corporation. Hamakua Health Center, a non profit community health center, provides outpatient medical care services and North Hawaii Community Hospital located in Waimea provides acute and emergency care services. A State public health center also serves the area.

Solid Waste

Solid waste transfer stations are located at Honokaa and Paauilo.

Cemeteries

There are four cemeteries at Kaapahu, Kainehe, Kukuihaele and Paalaea. Limited use and maintenance of the cemeteries are evident.

10.5.4.4.2 Course of Action

(a) Maintenance of the cemeteries shall be improved.

10.5.4.5 NORTH KOHALA

10.5.4.5.1 Profile

Health

Kohala Hospital in Kapaau was completed in 1963. This facility provides acute, skilled nursing and intermediate care, as well as emergency room, laboratory, and x-ray services.

Solid Waste

A solid waste transfer station has replaced the refuse disposal site at the old quarry in Kaauhuhu.

Cemeteries

There are two public cemeteries, at Kahei and Aamakao.

10.5.4.5.2 Course of Action

- (a) Maintenance of the cemeteries shall be improved.

10.5.4.6 SOUTH KOHALA**10.5.4.6.1 Profile**Health

The North Hawaii Community Hospital, which includes the Lucy Henriques Medical Center, provides health services for the districts of South Kohala and Hamakua. This hospital is a private, full service, acute care facility.

Solid Waste

The open dump sites in Waimea and in Puako have been replaced by solid waste transfer stations. Furthermore, the West Hawaii landfill is located in and operating in Puuanahulu.

Cemeteries

Public cemeteries are located in Paulama and Waimea.

10.5.4.6.2 Course of Action

- (a) A solid waste transfer site or alternative means of refuse collection should be established for Waikoloa.

10.5.4.7 NORTH AND SOUTH KONA**10.5.4.7.1 Profile**Health

Kona Community Hospital is a full service hospital located in Kealahou. Hospital services include acute inpatient medical/surgical, obstetrics, skilled nursing, intensive care, and outpatient surgery. Outpatient and ancillary services include a 24-hour emergency room, laboratory, radiology, pharmacy, occupational, physical, respiratory and speech therapy, and dietary services.

The hospital was constructed in 1975, and has undergone numerous renovations. A new ICU and expanded operating room area was added in 1990. In 1998-99, the obstetric unit was remodeled, emergency department renovated, and supply and admissions areas expanded. A special service building with conferencing and administrative

§10.5.4.8: KA'U

departments was also constructed. The hospital has completed a building with a 12-bed mental health unit and expanded outpatient services.

Solid Waste

Solid waste disposal sites, all of which utilized open pit dumping, were located in Keauhou, Kailua, Waiea and Keei. Transfer stations have replaced the dumps at Kailua, Keauhou, Napoopoo, Waiea and Milolii. The landfill at Kealakehe has been closed. A new landfill is now in operation at Puuanahulu. In accordance with State Department of Health and Environmental Protection Agency Regulations, the Kailua Landfill continues to be monitored.

Cemeteries

Two public cemeteries are located in Kona, the West Hawaii Veterans Cemetery and the Cemetery at Hienaloli.

10.5.4.7.2 Course of Action

(a) New privately owned cemetery sites to serve future needs shall be sought.

10.5.4.8 KA'U

10.5.4.8.1 Profile

Health

Ka'u Hospital, located in Pahala, was completed in 1979. Ka'u Hospital provides long-term care and minor acute care, obstetrics, emergency room, ambulance, and outpatient services. A public health center is also located in Naalehu.

Solid Waste

Solid waste transfer sites are located at Waiohinu and Pahala.

Cemeteries

Public cemeteries are located in Naalehu and Waiohinu.

10.5.4.8.2 Course of Action

(a) A solid waste transfer station should be established for Ocean View.



PUBLIC UTILITIES

11.1 OVERVIEW

11.1.1 Introduction and Analysis

Public utilities are services regulated by government and provided in response to existing and prospective patterns of development. Changes in land use, population density, and development usually generate changes in the demand and supply of utilities.

This section is concerned with the planning aspects of the water, electricity, telecommunication, gas and sewerage systems. Planning for the location of utility facilities such as reservoirs and pumping stations, sewage treatment plants, and telecommunications, is an important aspect of the land planning process.

Changes in the intensity of land use greatly influence the quantitative design of utilities and services, particularly their design capacity. Furthermore, there may be distinctions in the quality and type of services offered for each utility as land use intensities vary. These distinctions also depend on local codes and ordinances, health and sanitary considerations, and practices followed by the utility companies.

11.1.2 Goals

- (a) Ensure that properly regulated, adequate, efficient and dependable public and private utility services are available to users.
- (b) Maximize efficiency and economy in the provision of public utility services.
- (c) Design public utility facilities to fit into their surroundings or concealed from public view.

11.1.3 Policies

- (a) Public utility facilities shall be designed to complement adjacent land uses and shall be operated to minimize pollution or disturbance.
- (b) Provide utilities and service facilities that minimize total cost to the public and effectively service the needs of the community.
- (c) Utility facilities shall be designed to minimize conflict with the natural environment and natural resources.

§11.2: Water

- (d) Improvement of existing utility services shall be encouraged to meet the needs of users.
- (e) Encourage the clustering of developments in order to reduce the cost of providing utilities.
- (f) Develop short and long range capital improvement programs and plans for public utilities within its jurisdiction that are consistent with the General Plan.
- (g) Water, sewerage, electricity, gas, and telecommunication services are treated individually in this section to clarify the factors that comprise the public utilities element.

11.2 WATER

11.2.1 Introduction And Analysis

The availability of water is crucial to any type of development, whether urban, rural, or agricultural. Land use allocation therefore must be closely related to water availability, including the quantity and quality of the water, and the adequacy of the transmission and distribution system.

Sources of water supply include ground water and surface water. The most common sources of water supply are springs, tunnels, streams, and deep wells.

The demand for water is directly related to population and industry usage is expressed as gallons per day (gpd) or million gallons per day (mgd). Demand does not represent domestic consumption alone, but also includes all agricultural, industrial and commercial uses, fire protection, and other uses. In some areas, however, non-domestic users are likely to create the major demand, and careful attention must therefore be given in any study of probable future water needs.

Sources of water for the Department of Water Supply's water system include surface water and groundwater, both of which must comply with the Federal Safe Drinking Water Act (SDWA). The U.S. Environmental Protection Agency through the State Department of Health administers regulation for this act.

The most common sources of surface water are streams, springs, and tunnels. Groundwater sources include either basal or high level aquifers.

Surface water or a groundwater source under the influence of surface water is required to be treated and quality monitored to ensure compliance with the SDWA, whereas groundwater need only be chlorinated. As such, the maintenance of surface water systems are much more expensive and labor intensive.

§11.2.1: Introduction And Analysis

The Federal SDWA regulates all public water systems. Regulation compliance is a major impact for the Department of Water Supply. Within the next seven years, the department will spend approximately \$20 million for compliance projects.

The Department of Water Supply operates and maintains twenty-three separate water systems in the County. In addition, the State operates an agricultural water system in Lalamilo and the Hamakua/Paauilo Irrigation District, and there are several agricultural and domestic water systems within the county that are privately owned, maintained and operated.

The State Department of Land and Natural Resources, Division of Land and Water Development also has the capacity to explore and develop new ground water sources. The County has in the past depended upon this agency for source development. The development of new sources requires the cooperation between State and County agencies in the delivery of municipal water systems.

The high rainfall areas between the 2,000 and 4,000-foot elevations on the windward side of the island and also on the western slope of Hualalai contribute the bulk of the water to the island's streams, springs and basal aquifer. Each type of source has its advantages and disadvantages. Surface water flows depend on weather conditions. During extremely dry weather conditions, the flow may drop below the required rate. During high rainfall periods the water may be turbid. Spring and tunnel sources are also susceptible to these problems but usually to a lesser degree. These high level intakes are generally located above the communities they serve and have the advantage of gravity flow. Deep well sources on the other hand are more dependable but higher operational expenses are incurred since electrical energy is required to lift the water. Since some wells are located in the lower sections, contamination from urban expansion is a possibility. Controlled land use would minimize this problem. Wells can also be contaminated by seawater intrusion if pumped at a high rate. One solution to improve systems presently served by only surface sources is to install a well in these systems, use the surface sources when available, and use the pump when the surface sources are deficient. This would minimize operational costs and upgrade systems so they are more dependable. Another solution is to construct large storage reservoirs. These, however, require high initial capital expenditures.

Many systems, though adequate to fulfill domestic needs, are inadequate for fire protection and do not meet the needs of current agricultural production. Such systems serving urban areas are proposed to be upgraded.

The present average water consumption for the County water system is approximately 22.35 mgd.

§11.2.2: Policies

In several subdivisions throughout the island, roof catchment is also the primary means of water supply and is supplemented by trucking during drought periods. These subdivisions were approved prior to the adoption of the Subdivision Control Code.

The exploration for new water sources will continue. It is anticipated that these new water sources and systems will further influence land development.

11.2.2 Policies

- (a) Water system improvements shall correlate with the County's desired land use development pattern.
- (b) All water systems shall be designed and built to Department of Water Supply standards.
- (c) Improve and replace inadequate systems.
- (d) Water sources shall be adequately protected to prevent depletion and contamination from natural and man-made occurrences or events.
- (e) Water system improvements should be first installed in areas that have established needs and characteristics, such as occupied dwellings, agricultural operations and other uses, or in areas adjacent to them if there is need for urban expansion.
- (f) A coordinated effort by County, State and private interests shall be developed to identify sources of additional water supply and be implemented to ensure the development of sufficient quantities of water for existing and future needs of high growth areas and agricultural production.
- (g) The fire prevention systems shall be coordinated with water distribution systems in order to ensure water supplies for fire protection purposes.
- (h) Develop and adopt standards for individual water catchment units.
- (i) Cooperate with the State Department of Health to develop standards and/or guidelines for the construction and use of rainwater catchment systems to minimize the intrusion of any chemical and microbiological contaminants.
- (j) Cooperate with appropriate State and Federal agencies and the private sector to develop, improve and expand agricultural water systems in appropriate areas on the island.
- (k) Promote the use of ground water sources to meet State Department of Health water quality standards.
- (l) Continue to participate in the United States Geological Survey's exploratory well drilling program.
- (m) Seek State and Federal funds to assist in financing projects to bring the County into compliance with the Safe Drinking Water Act.

- (n) Develop and adopt a water master plan that will consider water yield, present and future demand, alternative sources of water, guidelines and policies for the issuing of water commitments.
- (o) Expand programs to provide for agricultural irrigation water.

11.2.3 Standard

- (a) Public and private water systems shall meet the requirements of the Department of Water Supply and the Subdivision Control Code.

11.2.4 Districts

The following is an analysis by district for water systems. The brief analysis of each district is intended to bring into focus the relationship of the district to the County as a whole.

11.2.4.1 PUNA

11.2.4.1.1 Profile

Currently, there are four major water systems in the district: Olaa-Mt. View, Pahoia, Kapoho, and Kalapana. The total average consumption of these systems is 1.2 mgd.

The Olaa-Mt. View water system consists of eleven service areas and extends along the Volcano Road from the former Puna Sugar Company mill to the Olaa Reservation Lots and along the Keaau-Pahoia Road to the vicinity of Kaloli Drive. Water for this system is supplied by three deep wells. Two of the wells are located at the former Puna Sugar Co. mill site and the third is near Olaa, between Keaau and Kurtistown. The average consumption of this system is about 0.82 mgd. Olaa Well C, the primary source for this system, has a maximum pump capacity of 2.0 mgd. Olaa Wells A and B have capacities of 1.6 mgd and 0.72 mgd, respectively.

The Pahoia water system, located in the geographic center of the lower Puna region, extends from Keonepoko Homesteads down along portions of the Kapoho and Pohoiki Roads to Kapoho. The present average consumption is 0.40 mgd.

The Kalapana Water System extends from the Keauohana Forest Reserve along Highway 13 down to the Kaimu Beach intersection and continues in a southwesterly direction along Highway 13, ending in the vicinity of Kaimu. The water for the Kalapana system is supplied by two deep wells at Keauhana with maximum pump capacities of 0.38 mgd and 0.50 mgd.

The Hawaiian Beaches subdivision located in Waiakahiula is served by a privately owned water system. The developer had constructed this non-dedicable system.

§11.2.4.2: SOUTH HILO

The Glenwood and Volcano areas are presently not serviced by any public water system. Many of these areas still depend on roof catchment systems.

11.2.4.1.2 Courses of Action

- (a) Continue to improve inadequate water system facilities.
- (b) Water source investigation and exploration should be continued in order to provide service for anticipated needs.
- (c) Investigate additional groundwater sources in the Oloo area.
- (d) Investigate alternative means to finance the extension of water systems to subdivisions that rely on catchment.

11.2.4.2 SOUTH HILO

11.2.4.2.1 Profile

The Hilo Water System extends as far as Alae Point to the north, Panaewa Agricultural Park to the south, Keaukaha to the east, and Kaumana and Waiakea Uka to the west. The Hilo Water System is supplied with water from both surface and groundwater sources. The sources are:

- 1 Oloo Flume Source: This spring source flow capacity ranges from a low of less than 1.0 mgd to a high of about 11.0 mgd depending on climatic conditions.
- 2 Panaewa Well: Water from this source is pumped from the basal aquifer with three pumps; one, with a 2.2 mgd capacity and two each with a capacity of 3.1 mgd.
- 3 Piihonua Well: This source has a capacity of 3.0 mgd. From this location, water may be pumped up to higher elevations during dry weather conditions. Water from this source is pumped from the basal aquifer with two pumps; both with a maximum pumping capacity of 2,100 gallons per minute or 3.0 mgd.

These three sources supply Hilo, which presently consumes an average of approximately 6.0 mgd. When the surface sources are low, more water is used from the Panaewa and Piihonua Wells. These three sources have a total normal capacity of over 20 mgd.

The Papaikou water system serves Papaikou Village, Puueopaku, Paukaa and Kalaoa. This system is served by two perched water sources, Kaieie and Papaikou intakes and a well source located just above Papaikou Village. Kaieie is the most dependable surface source while the Papaikou intake source is inconsistent. The present average consumption is about 0.23 mgd.

Pepeekeo is served by a deep well. Present consumption is about 0.16 mgd.

§11.2.4.3: NORTH HILO

The Honomu system, dedicated to the County by the former Pepeekeo Sugar Co., has an average daily consumption of 0.06 mgd. This system obtains its water supply from Kolekole Stream above Akaka Falls.

The Wailea-Hakalau system is a low capacity system comprised of one well and one storage tank together with connecting lines and limited distribution facilities. Currently, 95 customers consume about 0.028 mgd.

11.2.4.2.2 Courses of Action

- (a) Continue to implement water system maintenance and improvement programs in order to provide the city with a dependable and consistently safe drinking water supply.
- (b) Investigate groundwater sources in the upper Waiakea Uka, Kaieie Mauka, Kulaimano, Saddle Road, and Honomu areas.
- (c) Further investigate future ground water resources.
- (d) Replace existing surface sources with groundwater sources to meet State Department of Health standards.

11.2.4.3 NORTH HILO

11.2.4.3.1 Profile

Domestic water is available in the built-up areas of the North Hilo district. The private and public systems provide a wide range of levels of service.

The Laupahoehoe system obtains its water from high level springs in Manowaiopae and Kuwaikahi Gulches and two deep wells with Well No. 1 outfitted with a 0.14 mgd pumping unit and Well No. 2 with a 0.43 mgd pumping unit. None of the spring sources are dependable during dry weather. The present average daily consumption is 0.11 mgd.

The Ookala system is currently serviced by the Ookala Well.

11.2.4.3.2 Courses of Action

- (a) Replace old, substandard, or deteriorating lines and storage facilities.
- (b) Develop a standby well for the Ookala system.

11.2.4.4 HAMAKUA

11.2.4.4.1 Profile

Domestic water is available in all of the urban areas of the district. Some of the existing lines, however, are small and would be inadequate for a denser population.

§11.2.4.5: NORTH KOHALA

The service area of the Hamakua Water System extends from Ahualoa to Pohakea. Except for the town of Honokaa, the major portion of the system serves a scattered and dispersed population in the Ahualoa, Kalopa, Kaapahu, Pohakea, Paauhau and Paauilo Homesteads. The Hamakua system obtains its water from the high level streams in the Kohala Mountains and the Haina deep well. Over fifty-five per cent of the 0.63 mgd used by the Hamakua system is used in Honokaa.

The Paauilo system, although presently connected to the Hamakua system, has an additional source. The capacity of the Paauilo deep well is 0.43mgd and the service area extends from Paauilo Village to Kaa. The present average daily consumption is 0.10 mgd.

11.2.4.4.2 Courses of Action

- (a) Continue to coordinate programs with State and Federal agencies to develop a well at Kukuihaele and Honokaa Hospital to the standards of the Department of Water Supply.
- (b) Replace old, sub-standard, or deteriorating lines and storage facilities.
- (c) Investigate groundwater sources in the Honokaa and Kukuihaele areas.

11.2.4.5 NORTH KOHALA

11.2.4.5.1 Profile

The North Kohala District obtains water primarily from two wells and a spring.

The Hawi Wells No. 1 and 2 serve the following areas: Kaauhuhu, Hawi-Kokoiki, Kynnersley-Kapaau, and Halaula. The average consumption for this system is 0.30 mgd.

The Makapala-Keokea water system source is from the Murphy Tunnel owned by Chalon International of Hawaii. Present consumption is 0.0281 mgd.

11.2.4.5.2 Courses of Action

- (a) Pursue a ground water source for the Makapala-Keokea water system.
- (b) Explore further sources for future needs.
- (c) Improve and replace inadequate distribution mains and storage facilities.
- (d) Encourage efforts to improve the Kohala ditch system and its use for agricultural purposes.

11.2.4.6 SOUTH KOHALA

11.2.4.6.1 Profile

The South Kohala District acquires its water from the Waimea and Lalamilo systems. The present average daily consumption of both systems is 3.9 mgd.

The Waimea system primarily services the Waimea and Puukapu area. The source feeding the Waimea System is the Waikoloa and the Kohakohau Streams. Flow from the streams varies greatly with the weather. During extended drought periods, the supply is not sufficient to meet demands. Presently, the system has five reservoirs with a total capacity of 162.5 million gallons. The Waimea-Puukapu system uses an average of 0.91mgd.

Two exploratory wells tapping high level ground water were drilled in South Kohala. An exploratory well was drilled at the Department of Water Supply treatment plant site to support the Parker Ranch 20/20 development plan. The second exploratory well was drilled at the Department of Water Supply's Waiaka tank site.

In addition, the high level aquifer has been tapped for agricultural emergencies at the State Department of Agriculture's' Puukapu well, and there is a private well at the Waimea Country Club.

The Lalamilo system obtains its water from six deep wells at the 1,200-foot elevation. The area of service for the Lalamilo system extends from Kawaihae to Mauna Lani. The present average daily consumption is 3.0 mgd.

The Waikoloa Development Company developed its own water system to serve the needs of Waikoloa Village and the Waikoloa Beach Resort. The water system is in private ownership.

11.2.4.6.2 Courses of Action

- (a) Seek alternative sources of water for the Lalamilo system.
- (b) Improve and replace inadequate distribution mains and steel tanks.
- (c) Continue to seek additional groundwater sources for the Waimea System.

11.2.4.7 NORTH AND SOUTH KONA

11.2.4.7.1 Profile

The Kona system can be divided into the North Kona and South Kona systems. Although the two systems are connected, the line dividing the two systems runs along the Honalo ahupua'a. These systems are interconnected to transport water from one system to the other. This is done only during emergencies and on a very limited basis.

§11.2.4.7: NORTH AND SOUTH KONA

Four wells and one shaft at Kahaluu and one well each at Holualoa, Keahuolu, Kalaoa, Honokohau and Hualalai supply the North Kona system. The Kahaluu wells provide the bulk of the water for the North Kona system with a total capacity of 14.9 mgd. The estimated safety capacity based on the largest pump on standby, however, 12.9 mgd. The present average water usage is about 8.5 mgd.

The four deep wells at Kahaluu and the Holualoa Wells service the upper service area along Mamalahoa Highway from Honalo to Waiaha. Demand in the area averages 0.6 mgd. The Keahuolu and Honokohau wells supply water along Mamalahoa Highway from Waiaha to Kalaoa and along Palani Road from Mamalahoa Highway to Kealakehe. Demand in these areas average 0.8 mgd. The Hualalai and Kalaoa wells supplement the subdivisions in Kaloko, Kalaoa and Kona Palisades with an additional 0.4 mgd.

The Kahaluu Shaft services the lower service area along the Queen Kaahumanu Highway from Keauhou to the Kona International Airport at Keahole. Demand in this area averages 5.7 million gallons per day, the highest consumption rate in Kona.

The South Kona system is supplied by three wells at Keei and a well at Halekii, with a total capacity of 5.0 mgd and a safe capacity of 3.0 mgd. The average usage 0.97 mgd. This system serves the area from Honalo to the Hookena Beach Road junction.

11.2.4.7.2 Courses of Action (North Kona)

- (a) Continue to pursue groundwater source investigation, exploration and development in areas that would provide for anticipated growth and an efficient and economic system operation.
- (b) Continue to evaluate growth conditions to coordinate improvements as required to the existing water system in accordance with the North Kona Water System Master Plan.
- (c) Explore and develop a well in Waiaha.

11.2.4.7.3 Courses of Action (South Kona)

- (a) Continue to pursue groundwater source investigation, exploration and development in areas that would provide for anticipated growth and an efficient and economic system operation.
- (b) Continue to evaluate growth conditions to coordinate improvements as required to the existing water system in accordance with the South Kona Water System Master Plan.

11.2.4.8 KA'U

11.2.4.8.1 Profile

The water source for the Pahala area is Alili Tunnel and a deep well source. The present average consumption of the Pahala system is 0.23 mgd.

The sources supplying Waiohinu, Naalehu and South Point are Haao Springs, Mountain House Tunnel Spring and a deep well in Naalehu. The water from the Mountain House Tunnel is piped to Haao Spring and distributed to South Point, Waiohinu, and Naalehu on separate lines.

The Department of Water Supply has a license with the State that allows the department to obtain water from the Mountain House Tunnel.

The Waiohinu system receives its water supply from an 8-inch line from Haao Springs. Presently, the average consumption is 0.12 mgd.

The Naalehu system receives its water supply from the Waiohinu system. The former sugar plantation has dedicated the system within Naalehu Village to the County. The Naalehu deep well with a capacity of 0.54 mgd supplements the system. The average water consumption is 0.08 mgd.

The present average consumption on the South Point system is 75,730 gallons per day. The Ka'u area has several large subdivisions still dependent on individual roof catchment.

11.2.4.8.2 Courses of Action

- (a) Provide additional water system improvements for the currently serviced areas of Naalehu, Waiohinu, and Pahala.
- (b) Pursue groundwater source investigation, exploration and well development at Ocean View, Pahala, and Waiohinu.
- (c) Continue to evaluate growth conditions to coordinate improvements as required to the existing water system.
- (d) Investigate alternative means to finance the extension of water systems to subdivisions that rely on catchment.

11.3 TELECOMMUNICATIONS

11.3.1 Introduction and Analysis

The telephone is an essential means of voice communication for the majority of residents in Hawaii County. However, over the last decade, the County has seen an acceleration in the development of telecommunication technology and a transformation of the telecommunications industry. In addition to traditional phone communication, the telecommunications industry now includes technologies such as wireless cellular and digital mobile phones, the internet and world wide web.

During the last decade, wireless telecommunications has experienced a dramatic decrease in cost and a phenomenal increase in availability. Changes in technology and competition in the industry have made wireless communication more affordable to the general public.

The wired infrastructure that was once used to connect a telephone to the phone system has evolved to include the world wide web and internet. The world wide web and internet uses the telephone infrastructure to transfer digital data from one computer to another. Thus, everything from simple text messages to high level banking and commerce transactions can be conducted almost instantaneously. In the near future, the changes in technology and the wireless industry may make wireless access to the internet more widely affordable and/or available.

As of August 7, 1998, the entire island of Hawaii had 100 per cent digital switching. Digital switching is significant because it enables the existing telephone infrastructure to accommodate high-speed data transfers and access to many of the latest telecommunications services and features.

Currently, every region on the island has access to phone service. In 1998, the last rural areas restricted to party line service were upgraded with additional telephone cables allowing single line services islandwide.

Advances in fiber optic technology provide the backbone for the island's high-capacity broadband requirements and the necessary services for specialized users such as the telescopes atop Mauna Kea. Furthermore, frame relay, Asynchronous Transfer Mode (ATM) and internet services are transmitted via Verizon Hawaii's fiber optic network. Currently, high speed internet connections such as Digital Subscriber Lines (DSL) are only available in certain areas on the island. However, these services are bound to expand.

Advances in telecommunications are not without cost or concerns. One such concern is the construction and location of telecommunication towers. Telecommunication towers are the physical structures to which antennas are attached to facilitate wireless

communication. Because of the need for a clear line-of-site, telecommunication towers are usually located in areas with minimum obstructions between the tower and its area of service. Line-of-site refers to the imaginary line between a mobile phone antenna and a telecommunication tower. If there are impediments between the mobile phone antenna and the telecommunication tower, there may be signal degradation or signal loss. For example, the loss of line-of-sight occurs when a person uses a mobile phone while driving through a tunnel. Most often, communication is lost or unclear. The line-of-sight requirement often necessitates the conspicuous location of many telecommunication towers. Consequently, the telecommunications tower is usually much taller than the surrounding structures or vegetation and may negatively impact the scenic nature of a given area.

Currently there are over 95,000 switched telephone connections in service on the island. The State Public Utilities Commission regulates telephone service statewide.

11.3.2 Policies

- (a) Encourage underground telephone lines where they are economically and technically feasible.
- (b) Work with the telecommunications industry to increase the availability of emergency telephones throughout the island.
- (c) Develop standards for the construction of wireless telecommunication facilities.
- (d) Work closely with the telephone company to provide all users with efficient service.

11.3.3 Standard

- (a) In the development and placement of telephone facilities, such as lines, telecommunications and cellular towers, poles, and substations, the design of the facilities shall consider the existing environment, and scenic view and vistas shall be considered and preserved where possible.

11.4 ELECTRICITY

11.4.1 Introduction and Analysis

The Hawaii Electric Light Company, Inc. (HELCO), supplies electricity for the County. Peak electrical demand in 1999 was 170.2 megawatts (MW). HELCO's power generation system presently has a total firm capacity of 260.4 megawatts. HELCO purchases a total of 112 megawatts of firm power from three privately-owned companies--Hilo Coast Power Company (coal at 22 megawatts), Hamakua Energy Partners (60 megawatts) and Puna Geothermal Venture (geothermal at 30 megawatts). The balance of 148.4 megawatts is produced by HELCO-owned steam units, diesel units,

§11.4.1: Introduction and Analysis

and gas turbines. These power plants are located at Keahole, North Kona; Waimea, South Kohala; Waiakea Peninsula and Kanoelehua, South Hilo; and Keaau, Puna.

HELCO owns four hydroelectric units and a windfarm that provide energy to the system. HELCO also purchases energy from an independent power producer with a capacity of about 11 megawatts of hydropower. All hydro units are run-of-the-river and are on the Wailuku River. The Lalamilo Windfarm is located west of Waimea.

There are two levels of transmission voltages to transfer power between areas on the Big Island. The main transmission voltage is 69kV. HELCO has four 69kV cross-island transmission lines. One line is the northern line connecting the Kanoelehua substation to West Hawaii via the Waimea substation along highway 19 following the Hamakua coastline. Two lines connect the Kaumana substation to the Keamuku substation along the Saddle Road. The fourth is the southern line connecting the Kanoelehua substation to West Hawaii via the Kealia substation along Highway 11 through the Puna and Ka'u Districts. The other transmission voltage is 13.8kV that includes three tie-lines in Hilo connecting the Shipman and Kanoelehua power plants. HELCO uses 34.5kV as a subtransmission voltage and three lines are used to service the Puna, Ka'u and North Kohala areas.

The existing distribution system consists of several different voltage levels: 2.4kV, 4.16kV, 7.2kV, 12.47kV and 13.8kV. The distribution system basically consists of overhead polelines and underground systems. Because of the vastness of the Big Island, the majority of the distribution system consists of overhead pole lines. Underground systems have been used more extensively in West Hawaii in the newer subdivisions and developments. HELCO currently operates major switching stations (used to transfer the flow of power between different transmission circuits) at critical locations around the island. These transmission switching stations provide greater system flexibility and increase system reliability in supplying power to the various distribution substations and eventually, to customers. Distribution substations, which transform voltages to distribution voltages, are also located island-wide in proximity to communities and other developments.

The Big Island has a potential to use more alternative energy in the form of geothermal, hydro, wind, solar thermal and photovoltaic systems. These sources have been included in HELCO's Intergrated Resource Planning (IRP) process. The goal of integrated resource planning is the identification of the resources or the mix of resources for meeting near and long term consumer energy needs in an efficient and reliable manner at the lowest reasonable cost including the need and timing of any new generation and new cross-island transmission lines. As identified in the IRP process, HELCO is planning to expand its generation facilities at Keahole, North Kona. The added generation at Keahole will improve the system voltage level in West Hawaii, improve system reliability and allow for the retirement of older generators in East and West

Hawaii. Because of the planned addition at Keahole, additional cross-island transmission lines can be deferred.

The LCO's long term plans include the eventual conversion of distribution circuits to 12.47kV where necessary. Therefore, any new distribution improvement or line extension will be designed for 12.47kV.

11.4.2 Policies

- (a) Power distribution shall be placed underground when and where practical. Encourage developers of new urban areas to place utilities underground.
- (b) Route selection for high voltage transmission lines should include consideration for setbacks from major thoroughfares and residential areas. Where feasible, delineate energy corridors for such high voltage transmission lines.
- (c) Continue to advise the electrical utility companies on the future revisions of their comprehensive Integrated Resource Plans.
- (d) Conform to safety standards as established by appropriate regulatory authorities.

11.4.3 Standards

- (a) There shall be minimal obstruction of scenic views and vistas by electrical facilities.
- (b) Facilities such as substations shall mitigate and minimize any aesthetic impacts to surrounding properties and scenic vistas.

11.5 GAS

11.5.1 Introduction and Analysis

Propane gas is widely used on the island of Hawaii. In some rural areas of the County, gas is the only source of power. Gas consumption on the Big Island rose from 3 million therms in 1969 to 8 million therms by 1998.

The Public Utilities Commission regulates 67 miles of gas mains and service lines on the Big Island. These lines serve approximately 1,600 customers and are located mainly in Hilo.

In addition, approximately 9,300 customers throughout the County are provided gas service by tank or cylinder. The Public Utilities Commission does not regulate this type of service. Major liquid propane gas substations on the island of Hawaii are located in Hilo, Kailua-Kona, Waimea, and Ka'u.

§11.5.2: Policy

Propane gas is used in both residential and commercial facilities. The primary uses for propane are water heating, cooking, and the drying of clothes. Other uses of propane include fuel for vehicles, emergency back-up electric generation, and decorative lighting. Residential customers are normally provided a 124-gallon tank.

11.5.2 Policy

- (a) Gas storage facilities shall be located to minimize danger to commercial and residential areas.

11.5.3 Standard

- (a) County ordinances shall reflect appropriate safety standards for gas facilities.

11.6 SEWER

11.6.1 Introduction and Analysis

Adequate sewer disposal systems are vital to safeguard public health and preserve the environment. An adequate system is one that minimizes contamination of both the ground water supply and the coastal waters, beaches and waterborne recreational areas and is not a visual and odor nuisance.

About 77 per cent of the County's population is served by cesspools. There is an increasing need to create a better system than individual cesspools, particularly in highly urbanized and shoreline areas. This is due to the possible pollution of ground water as well as cesspool seepage into coastal waters. More stringent pollution controls, especially in water quality standards, are being imposed by regulatory agencies. The State Department of Health (DOH) intends to promulgate rules that will prohibit cesspools in the County of Hawaii.

The problem of sewage disposal is discussed in more detail in a completed study of sewerage for all urbanized and urbanizing areas in the County of Hawaii. Portions of that study are incorporated in this report.

Hawaii County presently operates municipal sewerage in Hilo, Papaikou, Kapehu, Pepeekeo and Kealakehe. The remaining communities are served by private wastewater treatment facilities or individual facilities such as cesspools or septic tanks.

It is difficult to measure the adequacy or inadequacy of cesspools in a given area. Many factors, such as density of population, porous condition of the soil, underground geologic structure, and rainfall levels, have to be taken into account to determine the effects of cesspools. In some areas, they may be effective and in other areas, they may not. In August 1991, the State Department of Health adopted rules that require the use

§11.6.1: Introduction and Analysis

of septic systems in the most critical wastewater disposal areas. Critical wastewater disposal areas are areas around the island where cesspools are permitted. Sewerage disposal system designs must be examined with the particular area in mind. However, it is important to note that the critical wastewater disposal areas may be eliminated in the near future when the State Department of Health implements the prohibition of cesspools.

Of critical importance in an examination of sewerage disposal for a community is the cost of the system, including construction and operation costs. These costs vary with the characteristics of each area.

Land development plans for resort-residential complexes located in shoreline areas pose a potential water quality problem for adjacent near shore waters. Adequate treatment facilities are essential prerequisites for development.

The Safe Drinking Water Act of 1974 (PL 93-523) legislated the protection of all aquifers or portions of aquifers currently serving as drinking water sources and any other aquifer capable of yielding consumable water. This mandate was based on a national concern for the quality of the ground water and the increasing evidence of contamination of this valuable resource.

In 1976, the State Legislature enacted Act 84, Relating to Safe Drinking Water, which requires the State Department of Health to establish an underground injection control program in order to protect the quality of the State's underground sources of drinking water. Because of the importance of ground water as a source of municipal water supplies, the underground injection control program is considered a beneficial approach in the identification of aquifer that should be protected from subsurface disposal of wastewater through injection wells.

The protection of these aquifers is established by designating areas now being used or will be used in the future for drinking water supply. The Underground Sources of Drinking Water (USDW) will be protected from pollution by prohibiting the construction of new injection wells that may pollute the USDW. Injection wells are allowed in exempted areas. The boundary lines between the USDW and the exempted areas have been developed. Under Chapter 62, "Wastewater Systems", the DOH adopted a 1,000-foot setback of wastewater systems from all public drinking water wells and springs.

In compliance with the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500), the State Department of Health and the County of Hawaii jointly prepared the "Water Quality Management Plan for the County of Hawaii" in 1978 and subsequently updated the plan in 1980. In 1979, the County Council adopted the plan through resolution to serve as the planning guide for development of regional waste treatment systems and the control of non-point source of pollution. To implement the

§11.6.2: Policies

management plan, the County has prepared facility plans for various areas on the island. Facility Plans are plans developed by the County to satisfy a requirement for the application of loans from the State to develop wastewater treatment facilities. The facility plans identify problems, potential solutions and costs.

In 1985, the State Legislature enacted Act 282, Relating to Environmental Quality, which reassigns the County, effective July 1, 1987 or upon receipt of State funds, to assume complete administration and implementation for the regulation of sewerage and wastewater treatment system programs.

11.6.2 Policies

- (a) The "Sewerage Study for All Urban and Urbanizing Areas of the County of Hawaii, State of Hawaii," December 1970, and the "Water Quality Management Plan for the County of Hawaii," December 1980, shall be updated and used as guides for the general planning of sewerage disposal systems.
- (b) Private systems shall be installed by land developers for major resort and other developments along shorelines and sensitive higher inland areas, except where connection to nearby treatment facilities is feasible and compatible with the County's long-range plans, and in conformance with State and County requirements.
- (c) Immediate steps should be taken to designate treatment plant sites, sewerage pump station sites, and sewer easements according to the facility plans to facilitate their acquisition.
- (d) Continue to seek State and Federal funds to finance the construction of proposed sewer systems and improve existing systems.
- (e) Plans for wastewater reclamation and reuse for irrigation and biosolids composting (remaining solids from the treatment of wastewater is processed into a reusable organic material) shall be utilized where feasible and needed.
- (f) Require major developments to connect to existing sewer treatment facilities or build their own.

11.6.3 Standards

- (a) Incorporate sewage works standards proposed in the "Sewerage Study for All Urban and Urbanizing Areas of the County of Hawaii" and the "Water Quality Management Plan for the County of Hawaii."
- (b) Sewerage systems shall be designed for a particular area, depending on topography, geology, density of population, costs, and other considerations of the specific area.
- (c) There shall be a minimum of visual and odor pollution emanating from sewerage treatment facilities.

- (d) Applicable standards and regulations of the State Department of Health, Chapter 23 "Underground Injection Control."
- (e) Applicable standards and regulations of the State Department of Health, Chapter 54 "Water Quality Standards."
- (f) Applicable standards and regulations of the State Department of Health, Chapter 55 "Water Pollution Control."
- (g) Applicable standards and regulations of the State Department of Health, Chapter 62, HRS, "Wastewater Systems."
- (h) Applicable standards and regulations of Chapter 342, HRS; Act 282, Session Laws of Hawaii 1985; and Act 302, Session Laws of Hawaii 1986, Relating to Environmental Quality.
- (i) All wastewater disposal systems shall conform to the applicable provisions of Chapter 11-62, Hawaii Administrative Rules for the Department of Health to ensure proper treatment and disposal of wastewater and to prevent further contamination of waterways, underground water sources, and the coastal waters.

11.6.4 Districts

The district analysis was conducted on a planning area basis rather than by judicial districts.

11.6.4.1 PUNA

11.6.4.1.1 Profile

The Puna district is characterized by many small towns, largest of which are Keaau and Pahoā, and large non-conforming subdivisions.

At present, most residents in the Puna district are served by individual sewerage systems. The use of cesspools and individual household aerobic treatment units will probably be continued until such time as increased population distribution and densities make it economically feasible to install municipal sewerage systems.

Residences near the coastal areas are much more vulnerable to unsatisfactory results with individual disposal systems because of the relative proximity of the groundwater table to the ground surface. The close proximity of the groundwater table reduces the efficiency of individual disposal systems because there is less filtration that can occur before the effluent reaches the ground water. This reduced efficiency may also affect the quality of nearshore waters due to the reduced filtration.

11.6.4.1.2 Courses of Action

- (a) The use of cesspools shall be discontinued in the coastal areas where cesspools do not function satisfactorily to meet water quality standards. Individual household

§11.6.4.2: SOUTH HILO

aerobic treatment units approved by the State Health Department and the County of Hawaii could be utilized in these areas. Future sewerage systems for the Puna area would then naturally commence with service to the lower coastal areas.

- (b) Coordinate with W.H. Shipman Ltd. in the planning and development of a sewerage system for the Keaau area.

11.6.4.2 SOUTH HILO

11.6.4.2.1 Profile

The basic concepts of the Hilo regional wastewater management system are described in detail in the "Facilities Plan for the Hilo District, South Hilo, Hawaii (February 1980)."

Hilo is designated as an urban sewerage planning area. The County of Hawaii owns, operates, and maintains a sewerage system located on the Puna side of the Hilo International Airport. At present, the system consists of a 5.0 million gallons per day (mgd) secondary sewage treatment plant with an ocean outfall effluent disposal and a collection system of sewage pump stations, force mains, and gravity lines.

The existing municipal wastewater treatment facility in Pepeekeo has a design capacity of 500,000 gallons per day.

The Papaikou-Paukaa sewerage system consists of a 0.35 mgd secondary wastewater treatment plant, collection and transmission lines, and an outfall to convey effluent to the shoreline for discharge.

11.6.4.2.2 Courses of Action

- (a) Encourage the State Department of Health to monitor the wastewater received to provide sufficient base line data regarding the need for any future extension or expansion of waste water collection systems.
- (b) Expand the existing sewer collection system to all densely populated areas in and around Hilo.
- (c) Upgrade and/or rehabilitate aging sewer pump stations and collector sewers.

11.6.4.3 NORTH HILO

11.6.4.3.1 Profile

The towns along the coast of the North Hilo district are small plantation towns characterized by populations of less than one thousand. For some of these towns, the population is expected to decline.

At present, most residents are served by individual cesspools. Kapehu Camp has been provided with a soil purification wastewater treatment system. Municipal sewerage

systems for the small towns would not be economically feasible for some time and there appear to be no problems at the present time.

11.6.4.3.2 Course of Action

- (a) Continue operation of the existing sewerage system at Kapehu.

11.6.4.4 HAMAKUA

11.6.4.4.1 Profile

Many small communities, largest of which are Honokaa and Paauilo, characterize the Hamakua district. There are no public sanitary sewer systems in the Hamakua area. Oxidation ponds (pond that acts as a settling pond where bacteria can break down the sewage as the liquid seeps and filters down through the earth) serve the towns of Honokaa, Paauilo, Paauhau and Haina and are presently adequate. Municipal sewage systems for the smaller towns would not be economically feasible for some time.

11.6.4.4.2 Course of Action

- (a) Investigate possible alternatives to eliminate the need for and continued use of the oxidation ponds.

11.6.4.5 NORTH KOHALA

11.6.4.5.1 Profile

The North Kohala district is characterized by many small communities with populations under one thousand. There are neither County-operated collection or treatment facilities in this district nor any plans for constructing a collection and treatment system. Domestic sewage disposal is via cesspools or other individual wastewater systems. Individual sewage treatment units in the North Kohala area are functioning adequately. Considering the density and distribution of the housing units and the relatively small population growth anticipated, individual household waste disposal units will continue to be utilized unless restricted by the DOH.

11.6.4.6 SOUTH KOHALA

11.6.4.6.1 Profile

Most residences in the Waimea area are now being served by cesspools. As the population is expected to increase, a municipal sewerage system should be made available. Parker Ranch has constructed a limited collection system and treatment plant to service its development needs.

Existing sewerage systems within the Kawaihae-Puako area consists mainly of domestic sewage disposal via cesspools and individual wastewater systems. However, resort

§11.6.4.7: NORTH KONA

developments operate their own private treatment facilities. Cesspool problems are generally located along the Puako residential lots where the groundwater table is near the surface.

11.6.4.6.2 Courses of Action

- (a) Construct a Waimea sewerage system to provide sewer service and wastewater treatment facilities with an ultimate treatment capacity adequate for foreseeable growth. Consider water reclamation or subsurface type disposal.
- (b) Construct a sewerage system in the Puako beach lot area to service flows by utilizing existing resort wastewater treatment facilities as a means of wastewater disposal.

11.6.4.7 NORTH KONA

11.6.4.7.1 Profile

The basic concepts of the North Kona regional wastewater management system are described in detail in "The Facility Plan for the Kailua-Kona Sewage System, Phase IV (Northern Zone), April 1981" and "Area wide Wastewater Management Plan for North Kona, December 1976 (w/1981 Supplement)."

Most residences in the North Kona area are serviced by individual sewerage systems. Kailua and Kealakehe are being serviced by a municipal sewerage system. The existing Kealakehe Sewage Treatment Plant has a design capacity of 5.31 mgd.

The Keauhou area sewerage system is a 1.8 mgd secondary sewage treatment plant at Heeia to serve the Keauhou-Kona resort community. This sewage treatment facility is projected to eventually handle 3.6 mgd when the final increment is completed. This facility is owned by Keauhou Community Services Inc., a subsidiary of Kamehameha Investment Corp. Because of the limited extent of the existing collection system, developments in unsewered areas are relying on cesspools and individual wastewater systems for sewage disposal. Due to the permeable nature of the lava strata that allows the raw sewage disposed in cesspools and effluent disposed in seepage pits to seep rapidly through the strata and contaminate groundwater and adjacent coastal waters, great precaution must be exercised in averting the contamination of the waters.

11.6.4.7.2 Courses of Action

- (a) Expand the existing sewer collection system.
- (b) Upgrade the Kealakehe Wastewater Treatment Plant to produce tertiary (R-1) quality effluent.

11.6.4.8 SOUTH KONA

11.6.4.8.1 Profile

Cesspools and individual wastewater systems are the primary on-site treatment system in the South Kona area. Several small on-site package plants are also used to service shopping centers, a hospital, and a park. They discharge treated effluent into seepage pits or injection wells.

11.6.4.8.2 Courses of Action

- (a) Continue to work with the Departments of Health and Land and Natural Resources to preserve the Class AA water quality of Kealakekua Bay.
- (b) Continue the current methods of wastewater disposal in unsewered areas in compliance with State and County requirements. This includes individual wastewater systems in low density developments and private wastewater treatment plants in high density developments.

11.6.4.9 KA'U

11.6.4.9.1 Profile

The Ka'u district is characterized by many small communities, largest of which are Naalehu and Ocean View. The County has no sewerage system in the Ka'u district. A private system exists for the Punaluu Resort development at Punaluu, but most residents are served by individual waste disposal systems. The cesspools and septic systems presently in use in the Ka'u area apparently function adequately. Thus, considering the low density and wide distribution of the housing units and the relatively small population growth anticipated, the individual treatment units will continue to be utilized.

11.6.4.9.2 Course of Action

- (a) Work closely with landowners to insure the development of adequate sewerage treatment facilities.

§11.6.4.9: KA'U



RECREATION

12.1 INTRODUCTION AND ANALYSIS

Recreation provides an avenue for the fulfillment of social, cultural, physical and educational needs of people through leisure experiences.

Recreational facilities may be defined within two categories: Resource-based and Facility-based. Resource-based parks provide public access to and enjoyment of an outstanding natural or cultural resource. Valued resources include sandy beaches, non-sandy but protected swimming areas, scenic areas and hiking areas. The Federal and State governments play a dominant role in establishing resource-based parks such as the Hawaii Volcanoes National Park and Hapuna Beach State Park. Resource-based parks developed by the County are primarily beach parks. The other park category is facility-based parks. These types of parks are primarily developed by the County and provide for organized, spectator, or informal play recreational activities that are not dependent upon a natural resource. Playfields, gymnasiums, swimming pool complexes, and tennis courts are just some examples of facility-based parks.

The Federal government provides approximately 231,400 acres of resource-based parks on the island. The State government provides approximately 800 acres. The County's resource-based parks, which are primarily beach parks, total 260 acres.

Heavy demands will be placed on the recreational resources of the County as a result of an expanding population and a growing number of visitors. The resident population is expected to grow, thus increasing the use of recreational facilities. Ideally, all residents should have convenient access to the most popular recreation facilities, such as playgrounds, gymnasiums, swimming pools, and multi-purpose community centers. Although beach parks usually require suitable shoreline conditions, the popularity of shoreline activities mandate that beach parks be established in relation to population distribution, even if the area does not provide the best recreational resource. Some districts have benefited more than others in terms of the number of facilities-based parks and beach parks relative to population. North Kona, South Kona, South Kohala and Puna have the least amount of County facilities-based parks and beach parks in relation to population. State beach parks within the South Kohala and North Kona districts help to offset, in part, some of these deficiencies. The North Hilo and North Kohala districts have a disproportionately large number of County park acreage in relationship to their small populations.

§12.1: Introduction And Analysis

The island has a pleasant climate throughout the year and a variety of scenic areas ranging from snow-capped volcanic peaks to tropical rain forests and sunny beaches. With such natural assets, the people of the island generally go outdoors for their recreation. Traditionally, the shoreline areas have been preferred for fishing, swimming, picnicking, camping and informal passive recreation. Of the County's total 305 miles of tidal shoreline, only 1.2 miles are prime sand beach that is generally favorable for swimming and other water-oriented activities. The demand on these limited areas for public recreation is heavy and crowding occurs in some areas. Crowding is usually due to inadequate or undeveloped park acreage, roads and parking areas occupying usable recreation area, and the lack of adequate facilities in adjoining areas or other parks. Options for developing beach parks should include privately operated or maintained facilities or private concessions of beach park facilities.

The quality of recreation areas often diminishes with heavy expanded use. Sewage and industrial waste have penetrated into some swimming, surfing, fishing, and boating areas, reducing the availability and/or quality of these areas for recreation. There is also competition for prime beach area between the visitor industry and the residents. This competition will continue to increase in the future.

The County has a variety of parks including small neighborhood playgrounds, larger playfields, and parks of County-wide scope for active and passive recreation. On the island, there are 4 National parks, 20 State parks and a total of 118 County park sites, in addition to regional, district, community, and neighborhood parks. The County also manages recreational facilities including 9 swimming pools, 19 community/senior centers, 21 gymnasiums (includes 6 Department of Education facilities), and 15 miscellaneous facilities such as rodeo arenas, boat ramps, scenic lookout, drag strip, etc. Neighborhood parks and playfields lack adequate facilities in some communities. In some areas, community centers are used for meetings and cultural activities. School buildings are also used for community meetings, and school yards sometimes function as neighborhood playfields. Park pavilions are used for community activities and family socials. There are also facilities for specific recreational activities, such as golf courses, small boat harbors, and swimming pools.

The "County of Hawaii Recreation Plan" was prepared in 1974 to serve as a guide in the planning efforts for expansion, acquisition, and development of the County's recreational areas. This plan, however, needs to be revised and updated to reflect new and/or updated priorities. Such a plan is needed in order for the County to identify significant resource areas with recreational value. A detailed plan will allow the development of an acquisition program that could utilize a variety of tools or coordinate with other involved agencies or organizations to acquire lands for parks or access.

The recreational program of the County is presently targeted toward diversification of activities. Active team sports for all children and adults are continually being main-

tained. Recreational programs have been targeted for all ages with special emphasis to promote activities for youth.

In some rural areas where the population is sparsely dispersed the lack of convenient public transportation makes it difficult to take advantage of recreational facilities and programs.

Summer fun activities in the mornings are being conducted for six weeks during the summer at County parks as well as Department of Education facilities for all children, grades one to six. Additional enrichment programs may be offered in the mornings and afternoons when funding is available. Intercession programs are offered to accommodate students on year-round schedules.

The lack of adequate facilities and programs for pre-school children should be addressed with more intensity in the future. The construction of new facilities, the renovation of some of the existing ones, and the provision of adequate staffing should meet this need.

Cultural and social programs are offered to senior citizens in all communities. Activities include arts, crafts, games, dance, music, and educational classes. As the number of retired persons increases, additional activities and a broader program will be needed.

The county operates nine swimming pools offering recreational swimming, water safety instruction, and competitive swimming activity. To serve the Hilo area, one of two pools is operated primarily for water safety instructional purposes. Most county beaches are staffed with beach lifeguards on weekends and holidays as well as during summer school breaks to provide lifesaving and first aid services. Lifeguards are on duty every day of the week at the most heavily utilized beaches.

The Department of Education and the University of Hawaii system offer adult education courses for enrichment. They also sponsor lecture and film series in communities throughout the County. Various volunteer citizens' groups organize and encourage art exhibits, drama, dance, music, and other cultural performances.

Many of the cultural and educational programs are available only in the more densely populated areas. The need to expand these programs as well as other recreational opportunities for people in low density rural areas will continue.

Public access to the ocean and mountains have special recreational and cultural significance to the residents of this island community. Public access to coastal and mountain areas have been an essential element in the gathering of food, the transport of goods, and recreational purposes for both the island's residents and their ancestors. In recognition of the need to provide residents with the right of free movement in public

§12.2: Goals

space and access to and use of these public coastal and mountain areas, the Hawaii County Council adopted Ordinance No. 96 17 in 1996 to require the dedication of land for public rights-of-way as part of subdivision approval or the issuance of a building permit for the construction of a multiple-family residential development, under certain circumstances. The County may also require the establishment of public rights-of-way as part of the issuance of other types of land use approvals, such as changes of zone or Special Management Area Use Permits. Information regarding the State parks system, as well as public hunting areas, may be obtained by contacting the State Department of Land and Natural Resources.

12.2 GOALS

- (a) Provide a wide variety of recreational opportunities for the residents and visitors of the County.
- (b) Maintain the natural beauty of recreation areas.
- (c) Provide a diversity of environments for active and passive pursuits.

12.3 POLICIES

- (a) Strive to equitably allocate facility-based parks among the districts relative to population, with public input to determine the locations and types of facilities.
- (b) Improve existing public facilities for optimum usage.
- (c) Recreational facilities shall reflect the natural, historic, and cultural character of the area.
- (d) The use of land adjoining recreation areas shall be compatible with community values, physical resources, and recreation potential.
- (e) Develop short and long range capital improvement programs and plans for recreational facilities that are consistent with the General Plan.
- (f) The "County of Hawaii Recreation Plan" shall be updated to reflect newly identified recreational priorities.
- (g) Facilities for compatible multiple uses shall be provided.
- (h) Provide facilities and a broad recreational program for all age groups, with special considerations for the handicapped, the elderly, and young children.
- (i) Coordinate recreational programs and facilities with governmental and private agencies and organizations. Innovative ideas for improving recreational facilities and opportunities shall be considered.
- (j) Develop local citizen leadership and participation in recreation planning, maintenance, and programming.
- (k) Adopt an on-going program of identification, designation, and acquisition of areas with existing or potential recreational resources, such as land with sandy beaches

and other prime areas for shoreline recreation in cooperation with appropriate governmental agencies.

- (l) Public access to the shoreline shall be provided in accordance with an adopted program of the County of Hawaii.
- (m) Develop a network of pedestrian access trails to places of scenic, historic, natural or recreational values. This system of trails shall provide, at a minimum, an islandwide route connecting major parks and destinations.
- (n) Establish a program to inventory ancient trails, cart roads and old government roads on the island in coordination with appropriate State agencies.
- (o) Develop facilities and safe pathway systems for walking, jogging, and biking activities.
- (p) Develop a recreation information dissemination system for the public's use.
- (q) Revise the ordinance requiring subdivisions to provide land area for park and recreational use or pay a fee in lieu thereof.
- (r) Develop and adopt an Impact Fees Ordinance.
- (s) Consider alternative sources of funding for recreational facilities.
- (t) Develop best management practices for the development of golf courses in coordination with developers, State Department of Health, and other government agencies.
- (u) Provide access to public hunting areas.

12.4 STANDARDS

- (a) Regional Parks:
 - Major recreation area serving several districts and providing indoor and outdoor activities. A major center for spectator sports and cultural activities. May include features of historic, geological, and horticultural interests. Minimum size: 50 acres.
 - Vicinity of major populated areas.
 - Facilities include: multi-purpose building, auditorium, gymnasium, swimming pool, adequate parking areas, and facilities for spectator sports: football, baseball, softball, track field, tennis, basketball and volleyball.
- (b) District Parks:
 - Offer diversified types of recreational activities to an entire district that include indoor and outdoor sports. Minimum size: 10 to 30 acres.
 - Within a district consisting of several populated communities.
 - Facilities include: gymnasium with office, storage, restrooms, showers; a center for community and recreational programs; swimming pool (if justifiable); play area and equipment for young children; courts for basketball, tennis, and volleyball; ball-

§12.4: Standards

fields for soccer, baseball, softball, and football; night lights; and an adequate parking area.

(c) Community Parks:

- Community recreation area serving surrounding urban areas, and entire community in rural areas. Provides active and passive activities.
- Between 4 and 8 acres, within the center of the community or several neighborhoods.
- Facilities include: multi-purpose building; gymnasium (where not serviceable from a district park); courts for basketball, volleyball and tennis; ballfields for softball/baseball, soccer, football; play area and equipment for young children; walking and jogging paths; picnic and passive area; night lights and an adequate parking area.

(d) Neighborhood Parks:

- Provide open space in urbanizing areas for the general aesthetic enjoyment of the outdoors, play areas for young children, and a social gathering place for the neighborhood.
- Up to 4 acres, within the center of the neighborhood and preferably adjacent to a school.
- Minimum facilities include: restrooms; drinking water; walking and jogging paths (bike and skating paths); courts for basketball, volleyball and tennis; ballfields for tetherball, baseball/softball and soccer; play area and equipment for young children; and an adequate parking area.

(e) Community Centers:

- Major center for spectator sports, cultural and social activities.
- Size depends on facilities proposed and accessory uses.
- Facilities include: multipurpose building; auditorium; gymnasium; facilities for spectator sports; swimming facility; and an adequate parking area.

(f) Parks for General Use:

- Centered around a major natural asset, such as a sandy beach, a prime forest, or a volcanic feature and includes historic sites whenever feasible.
- Designed to accommodate users from throughout the County.
- Beach parks provide opportunities for swimming/sunbathing, surfing, camping, fishing, boating, nature study, and other pastimes. Every section of the island should be adequately served. Facilities depend on size and intensity of use but should include: restrooms with showers; picnic facilities; a defined tent camping area when allowed; drinking water; adequate parking; pavilions of various sizes; and lifeguard facilities.

§12.5.1: Puna

and Kurtistown. Ballfields are also located in Mountain View, Kurtistown, and Hawaiian Beaches subdivision. A multi-purpose sports field is proposed at the Hawaiian Beaches Park.

School activities take precedence over public use of joint-use facilities. There are lighted ballfields in Pahoia and Keaau.

Many of the other parks in the Puna district are heavily used by Hilo residents for picnicking, camping, swimming, surfing, and fishing. The proximity of Puna makes it easy for people in Hilo to travel to these areas.

The County's 1.7-acre Isaac Hale Beach Park is a beach area offering picnicking, camping, fishing, surfing, and swimming when the ocean is calm. A boat launching ramp facility is presently provided adjacent to the park at Pohoiki Bay. The present park area and facilities are inadequate. Cars, boats, and boat trailers often occupy areas within the park that could be used for recreational opportunities. Expansion of this park has been initiated by the County with the purchase of an adjacent 22 acres of land mauka of the existing park to be developed with additional parking areas, playgrounds, boat parking area, picnic facilities and restrooms.

Kaimu Beach Park's famous black sand beach and adjacent coconut grove, once one of the most photographed scenic attractions on the Big Island, were covered by lava flows from Pu'u O'o Crater, Kilauea Volcano in 1990. Less than a mile away, Harry K. Brown Park, at one time the Puna district's most popular beach park, was inundated in the same eruption.

In 1993, the County purchased approximately six acres of land situated 2,000 feet to the northeast of Isaac Hale Beach Park in an effort to replace park land destroyed by lava. The new Ahalanui Park features a naturally-occurring warm spring (Mauna Kea Pond) and a grassed area with scattered ornamental and coconut trees. Proposed improvements include the construction of a 54-stall parking lot, renovation of existing structures to accommodate a caretaker's cottage and community center, the construction of restrooms, access roadway and infrastructure improvements.

MacKenzie State Recreation Area (13.1 acres) is an ocean-oriented and forest park located between Pohoiki and Opihikao at the edge of the Malama-Ki Forest Reserve. Fishing, picnicking and tent camping are recreational activities of this park. Within the park is a well-preserved segment of the ancient Hawaiian King's Trail.

The State's undeveloped Nanawale Park site, consisting of 78.3 acres, is located adjacent to Honolulu Landing, along the Puna Coastal Road between Kapoho and the Hawaiian Shores Subdivision.

Near the Kapoho-Pohoiki junction, the Lava Tree State Monument (17.0 acres) features lava trees and large volcanic earth cracks and has a footpath, picnic facilities,

parking area, and restrooms. The park is landscaped, well maintained, with adequate facilities and area for present use. An additional area adjacent to the present park has been reserved for future expansion.

The County's Glenwood Park (1.1 acres), located along the Volcano Highway, adequately serves travelers as a picnic and rest stop.

Approximately 60,000 acres of the 229,176-acre Hawaii Volcanoes National Park is located within the Puna District. The facilities of the park for passive and active recreation are readily accessible.

12.5.1.2 Courses of Action

- (a) As the population increases and need arises, neighborhood parks in large subdivisions between Keaau and Pahoa should be provided and improved.
- (b) Encourage the State to establish a park reserve on State-owned land east of Kaimu.
- (c) Recommend the establishment of beach reserves at Kehena Beach and Opihikao (west of Opihikao junction).
- (d) Recommend that the State expand the MacKenzie State Recreation Area.
- (e) Develop the expanded Isaac Hale Beach Park recreation area. Provide trail access to Keahialaka Spring and Pond and Mahinaakaka Heiau.
- (f) Develop the Kapoho Tidepools as a marine park.
- (g) Establish a small scenic park overlooking Kapoho and provide minimum facilities.
- (h) Develop recreational areas along the coast between Hilo and Kapoho, including areas at Papai, Haena (Keaau), Kaloli Point, Keonepoko Nui, Honolulu Landing, and Nanawale.
- (i) Establish small scenic viewpoints along the Puna Road to overlook the rift zone and Kaueleau, Keekee and the 1955 flows.
- (j) Explore means to maximize the use of the Pahoa Neighborhood Facility site to serve the recreational needs of the lower Puna area.

12.5.2 South Hilo

12.5.2.1 Profile

Hilo is the major urban center in the County and has a diversity of recreational facilities. Within the city, there are eight neighborhood parks. All of these parks are between 3.0 and 7.7 acres in size and five have playfields. Nine school yards provide additional playfields. These parks are not used to their optimum capacity. In many of the parks, there are drainage problems. Lack of playground equipment, inadequate

§12.5.2: South Hilo

landscaping, and the lack of benches and adequate shelters have restricted the use of some parks. Some residential areas do not have easy access to neighborhood parks, and newer communities lack recreational areas altogether.

Hilo also has 17 gymnasiums: two are at University of Hawaii at Hilo, three are with the Department of Education, nine are under County jurisdiction, and three are privately owned and maintained.

Outside of urban Hilo, there is a County community park in Kaiwiki; a gymnasium in Wainaku; a playfield in Hakalau; a gymnasium and playfield in both Honomu and Paipaikou; and a community center and playfield in Kulaimano. Public use of facilities jointly administered by the County and the Department of Education is generally limited to after school hours.

Regional recreational facilities located in Hilo serve South Hilo and neighboring districts. There are three swimming pools, two owned by the County and the other administered by the Department of Education.

Hoolulu Complex is the major regional recreational center and consists of 56 acres. There is an auditorium with a seating capacity of 2,800 that is used for pageants, private fundraising, musical entertainment, and sports events. Although adequate for sports, the acoustics and seating are poor for entertainment. A large stadium (Wong) for sports events, a swimming pool, outdoor tennis courts, a covered tennis stadium (utilized for cultural events, car shows and other events), and a tri-baseball field are also located in the park. Parking is currently inadequate for large events. A new football/soccer field and parking area will be developed on lands located to the west of the Hoolulu Complex on Manono Street. The County is currently working with the owners of these lands to secure the site for its expansion plans.

The Hilo Armory is utilized for county programs, and organized sport events. It also houses various county agencies.

Five miles south of Hilo, the County maintains the Panaewa Recreation Complex located on a 173-acre parcel. The complex includes the Rainforest Zoo and the Equestrian Center, consisting of a race track, rodeo arena, and other equestrian facilities. The County also maintains the Hilo Drag Strip (70.66 acres) located east of Railroad Avenue. There is a three-fourth mile race track, spectator area and other support facilities. Also near the drag strip is a County-operated skeet and trap range.

Most beach areas in the district have little depth due to coastal roads or residential lots. Parking is often a problem and vehicles occupy valuable recreation area. There are eight developed beaches with about 3,000 linear feet of shoreline in Hilo. These are the Hilo Bayfront Beach, Mokuola (Coconut Island), Reed's Bay, Onekahakaha Beach Park, Leleiwi Beach Park, James Kealoha Beach Park, Carlsmith, and Richardson

§12.5.2: South Hilo

Ocean Park Beaches. Lihikai (Onekahakaha) has a small sand beach with shallow water and is especially good for children.

There is a two-mile stretch of coastline from Lehia Beach Park through Lihikai (Onekahakaha) that can be developed for recreation. The Reed's Bay area and Kuhio Bay (Baker's Beach) have sand beaches with potential for more intensive recreational use.

The County has two general use oceanfront parks: Liliuokalani (19 acres), currently undergoing extensive renovation and modification to improve accessibility, and Bayfront-Mooheau Park (20.9 acres). Near the mouth of the Wailoa River is the State's Wailoa River State Recreation Area, that includes a pond maintained as a public fishing area. These parks provide scenic landscaped open space and are used for picnicking, pleasure walking, quiet relaxation, and fishing. Large pavilions at Wailoa River State Recreation Area are frequently used for community meetings and banquets. Mooheau Park has a bandstand that is used for community gatherings and events. Noise from the nearby highway, however, often interferes with the use of the bandstand.

Steep cliffs make the coastal waters of the northern portion of the South Hilo district inaccessible except at the mouths of a few large gulches. North of Hilo are two beach parks located at the mouths of gulches. Honolii Beach Park (2.77 acres) is used primarily by surfers. Kolekole Gulch Park at Wailea is used mainly for picnicking and camping with limited swimming in the stream.

The County's 4.9-acre park at Kaumana Caves and the Wailuku River State Park (16.3 acres) in Hilo and Akaka Falls State Park (65.4 acres) in Honomu have outstanding natural features. The State maintains a scenic viewpoint at Alealea Point and the County has a scenic viewpoint at Onomea Lookout Point.

The three forest reserves in South Hilo offer limited wilderness recreation, primarily hunting and camping. The Waiakea Arboretum is used as a demonstration area for visitors.

There are three facilities for small boats in Hilo. One is located at the mouth of the Wailoa River and is used by fishing craft and other power boats. A launching ramp is provided. The others are moorages with minimal facilities in Reed's Bay and Radio Bay used by sailboats.

An 18-hole municipal golf course with an area of 164.9 acres is located in the Waiakea Homesteads area. A 9-hole privately owned golf course (63.2 acres) is located on the Waiakea Peninsula.

Three privately-owned museums provide educational resources to the community. The Pacific Tsunami Museum memorializes those who have lost their lives in tsuna-

§12.5.2: South Hilo

mis. Hawaii Shima Japanese Immigrant Museum chronicles the solicitation of Japanese nationals to work the sugar plantations and vividly illustrates their strong traditional cultural heritage and entrepreneurial spirit in braving adversities. The Lyman House and Memorial Museum strives to promote awareness and instill community pride by presenting programs and exhibits relating to the cultural, artistic, religious, and historical heritage of Hawaii.

12.5.2.2 Courses of Action

- (a) Maintain Clem Akina Park, Gilbert Carvalho Park, Keikiland Playground and Wainaku Camp 2 Field as community recreation.
- (b) Improve Kalakaua Park as an open space amenity and the focal point of the Kalakaua Park Heritage Area.
- (c) Encourage the development of a park along both sides of the Wailuku River in the central business district of Hilo and provide major viewpoints with pedestrian walkways and benches.
- (d) Community and/or neighborhood recreational areas should be provided in areas such as Piihonua, upper Ponahawai, Kaumana-Ainako, upper Kaumana, Haihai, and upper Waiakea.
- (e) Develop urban commercial areas with landscaped parks for passive recreation.
- (f) Expand the depth of coastal recreation areas. Park areas should be connected with trails to increase public access.
- (g) Develop the coastal area between Lehia and Lihikai for recreational use.
- (h) Develop Reed's Bay for more intensive water-oriented recreation.
- (i) Encourage the State to develop a small boat harbor and additional moorage facilities.
- (j) Develop Kuhio Bay and the Baker's Beach area as a public recreational facility.
- (k) Encourage the implementation of the "Environmental and Urban Design Proposals, East Hawaii Project, City of Hilo," and the "Downtown Hilo Redevelopment Plan" for the Kaiko'o and Bayfront areas. This includes the deepening of Waiolama Canal, the development of the proposed Waiolama River State Park, the elimination of Bayfront Highway and the widening and realigning of Kamehameha Avenue, and the establishment of botanical gardens.
- (l) Provide trail and access systems to recreational areas.
- (m) Develop a center/complex for major cultural, educational and recreational activities.
- (n) Develop a second municipal golf course.
- (o) Return Kaumana Caves County Park, a natural resource recreation area, to the jurisdiction of the State.

12.5.3 North Hilo

12.5.3.1 Profile

Recreational facilities in the North Hilo district are generally limited. The population of the area is small and scattered and transportation is a major problem. The community at Ookala has a gymnasium and ballfield that were previously owned by the sugar plantation but are now owned and maintained by the County. The Papaaloa community has a county gymnasium, community center, ballfield, and tennis courts. In Laupahoehoe, community groups use the former Court House as a meeting place. The Laupahoehoe School complex, with a 6-acre playfield, a gymnasium, two tennis courts and a County swimming pool, is also used by the community. There is an old gymnasium at Laupahoehoe Peninsula used primarily by area residents for various functions.

Two parks are located adjacent to the mouths of the larger gulches. Waikaumalo Park at Honohina is 3.4 acres in size and offers stream swimming and picnicking. Laupahoehoe Point Beach Park has an area of 24 acres and is being developed to serve as a regional recreation area. Facilities include a playfield, a boat ramp, four picnic shelters and a large pavilion. Camping, picnicking and fishing are featured activities in this scenic location. The water, however, is unsafe for swimming and the parking area is not defined. A joint effort undertaken by the U.S. Army Corps of Engineers and the County provided the community with a new breakwater and boat launching ramp.

Within the district are the Hilo Forest Reserve (54,020 acres) and the Manowaialee Forest Reserve (1,410 acres). Neither have facilities and are rarely used for recreation.

12.5.3.2 Courses of Action

- (a) Implement the Laupahoehoe Point Beach Park master plan.
- (b) Improve the boat launching facilities at Laupahoehoe Peninsula by encouraging the Army Corps of Engineers to extend the breakwater.

12.5.4 Hamakua

12.5.4.1 Profile

With the combined recreational facilities made available by the former sugar company, the schools and the County, the communities of the Hamakua district are adequately served. The sugar company previously provided neighborhood playground and playfield facilities in Haina and Paauhau. The County now owns the ballfield in Haina and the ballfield and gym at Paauilo Park. A community center was built by the County at Paauilo Park which, in addition, has an inadequately lighted field and gym. The Paauilo community also uses the five-acre school playfield.

§12.5.5: North Kohala

In Honokaa, the school grounds serve as a district park administered by the Department of Education. Other facilities include a 4.5-acre playfield, a swimming pool (County-owned and maintained), and a National Guard gym. Honokaa has a large County-developed park with two ballfields, a football/track field, and a gymnasium facility. The County also owns a rodeo arena mauka of the Hawaii Belt Highway. The Hamakua Country Club, a 9-hole golf course (19 acres) facility, is privately owned.

Two wildland State parks provide facilities for hiking, picnicking, camping and hunting. Cabins are available for overnight use. Mauna Kea State Recreation Area is 20 acres in size and located in the saddle between Mauna Kea and Mauna Loa. From this park, there is a hiking trail to the summit of Mauna Kea. During the winter months, the summit of Mauna Kea provides opportunities for skiing and other snow sports. Kalopa State Recreation Area (100 acres) is located in a native ohia forested area five miles southeast of Honokaa.

The State Division of Forestry and Wildlife administers four game management areas with a total area of about 290,000 acres. These provide an extensive area for hunting. There are also three forest reserves within this district that can be used for hunting, hiking, nature study, and wilderness camping. No facilities are provided and access to the forest reserves is limited.

The County maintains a scenic lookout area above Waipio Valley that has a shelter and facilities for picnicking. There is a State hiking trail into the adjoining valleys, including Waimanu Valley.

12.5.4.2 Courses of Action

- (a) Construct multipurpose rooms adjacent to the gymnasium in Honokaa Park to accommodate community meetings and functions.
- (b) Encourage the recreational development of Waipio and Waimanu Valleys as natural and wilderness areas. Encourage the State to provide small recreation sites on the edge of Waipio Valley.
- (c) Encourage the development of a general use park in the Kaa-Ahualoa section of the Hamakua Forest Reserve.
- (d) Encourage the State to develop a scenic park on the Kohala side of Hiilawe Falls in conjunction with the development of the scenic highway.

12.5.5 North Kohala

12.5.5.1 Profile

Scattered settlement in the North Kohala district makes it difficult for residents to get to recreation areas. Parks in this district consist of two school grounds and four County parks. The Halaula Middle Annex for Kohala High and Intermediate Schools, formerly the Halaula Elementary School, has a 5-acre playfield, playground, and

basketball court used by residents in the area. Kohala High School has a gym, playground, track, and a 4.5-acre playfield. The gym is used by the community for gatherings. Kamehameha Park in Kapaau is a major district park with an area of 18.4 acres. Facilities include a grandstand, lighted playfield, lighted tennis courts, a swimming pool, and a large gymnasium/community center complex. The park, however, is not large enough to accommodate major events. A community park to serve the Kahei area is being proposed.

Along the windward coast of the district, the County's Keokea Beach Park at Niulii, with an area of 7.1 acres and two pavilions, is the only developed beach area. Swimming at this park is limited because of ocean conditions. On the leeward side of the district are two County beach parks. Kapaa Beach Park has a total area of 28.3 acres, but only a small portion has been developed. Mahukona Beach Park has a total area of less than three acres and is located close to the harbor, which is popular for fishing and swimming. The harbor has a launching derrick maintained by the County but lacks docking and mooring facilities for small boats. Parking is inadequate at these beach parks. With the approval in 1993 of the proposed 240-unit Mahukona Resort on lands adjacent to Mahukona and Kapaa Beach Parks, the Hawaii County Council required the developer to provide various improvements to both Mahukona and Kapaa Beach Parks. These improvements will include facilities for active recreational uses and improvements to the existing access roadway, pavilion and restroom facilities, among others. Improvements to Kapaa Beach Park include accommodations for camping and passive recreational uses and the construction of restrooms and additional parking.

The Pololu Valley lookout at Niulii has limited parking but no other facilities. The valley itself is an area of scenic beauty. An access trail from the lookout descends into the valley.

The State manages three historical parks: Lapakahi State Historical Park, Kamehameha I Birthsite State Monument, and the Mookini Heiau State Monument.

12.5.5.2 Courses of Action

- (a) Expand facilities at Kapa`a Beach Park.
- (b) Encourage the State to further develop the Lapakahi complex as a historic park.
- (c) Recommend the expansion of small boat harbor facilities at Mahukona Harbor.
- (d) Expand the multi-use recreation areas at Mahukona and Kapaa Beach Parks.
- (e) Encourage the State to dedicate approximately 12 acres of its lands surrounding Mahukona Beach Park to the County to accommodate the expansion of Mahukona Beach Park.
- (f) Encourage the development of the Upolu Point area for recreation, including access to fishing areas.

12.5.6 South Kohala

12.5.6.1 Profile

Recreation areas in the South Kohala district are limited. The Waimea Elementary and Intermediate School has a playground and a gymnasium used during school days; and jointly operated by the County after school hours. The County's Waimea Park (10.5 acres) is the district's recreation center with a community center, playfields and facilities for spectators, tennis courts, restrooms, and an attractive playground for young children. One playfield and the tennis courts are provided with lights for night activities. This park is often a rest and picnic stop for travelers. Parking, however, is undefined and restroom facilities are inadequate. The County also maintains a 2.8-acre passive roadside park area in Waimea. A four-acre neighborhood park was developed in Waikoloa Village and a community park adjacent to the Waikoloa School is currently being developed.

The Waimea community center is a County facility. A senior citizen center is operated by the County at the former courthouse in Waimea. There are private rodeo facilities at Parker Ranch and Waikoloa.

The island's major white sand beaches stretch along the coast of South Kohala. Hapuna Beach State Recreation Area and the County's Samuel M. Spencer Beach Park are the major developed areas. The Queen Ka'ahumanu Highway between Kawaihae and Kailua has made the beaches of South Kohala more accessible. Hapuna is 61.1 acres in size and is the major water-oriented recreation area in the County. Samuel M. Spencer Park near Kawaihae Harbor has an area of 13.4 acres and a sandy coastline of approximately 1,200 feet. The water is shallow and is frequently used by family groups. Both Hapuna Beach and Samuel M. Spencer Parks receive intensive use. In addition to these public beach parks, public access to the beaches at Anaehoomalu, Mauna Lani, and Mauna Kea have been provided. The perimeter breakwater of the Kawaihae Small Boat Harbor is now complete. This new breakwater was constructed at the southern end of the harbor by the Army Corps of Engineers in 1998. Infrastructure will be added by the State when funding can be appropriated. The present small boat harbor has moorings for 40 boats and a pier with 3-point (Tahitian-style) moorings that can accommodate six boats.

The National Park Service manages the Pu'ukohola Heiau National Historic Site overlooking Samuel M. Spencer Beach Park.

There are 18-hole golf course sites located at the Mauna Kea Resort (2), Waikoloa Village, Mauna Lani Resort (2), and Waikoloa Resort (2). These courses are privately owned but open to the public. Also open to the public is the 18-hole Waimea Country Club.

§12.5.7: North Kona

also accommodate baseball, football, soccer and track activities. Construction is in progress to provide dugouts, bleachers and other improvements to these playfields.

The Kailua Park (Old Kona Airport) consists of 34 acres and provides lighted fields for baseball, softball, and football. New baseball and soccer fields were recently constructed. Also situated here are four lighted tennis courts. The old terminal building houses restrooms, offices, and a meeting place. A multipurpose gymnasium was completed in 1993 and a 50-meter Olympic-size swimming pool was completed in 1999.

Using the ratio of 5.0 acres of recreation area for every 1,000 people, the district of North Kona should now have at least 137 acres of area for community recreation.

The County has three developed beach parks in North Kona. Laaloa Bay Beach Park is located along Alii Drive south of Kailua-Kona. Pahoehoe Beach Park is located north of the White Sands Beach. Kahaluu Beach Park (5.4 acres), also along Alii Drive, is located in close proximity to the hotels at Keauhou and receives intensive use from visitors and residents. The park also has a unique and readily accessible coral garden with an abundance of marine life. It is usually overcrowded.

There are three small boat harbors in the district: Kailua Bay, Keauhou, and Honokohau. Honokohau harbor has a capacity for 450 small boats and has other facilities to accommodate boat repair, restaurant, dry storage, etc. The Kailua Bay anchorage provides limited docking facilities and offshore anchorage for small boats and commercial charter and tour boats. The wharf is used as a promenade, a fishing area, and is the center of the Annual Billfish Tournament. Parking and comfort facilities are inadequate. The nearby small sand beach is used for swimming. Keauhou Boat Harbor is a small marina and has a launching ramp as does Honokohau. Facilities are inadequate.

The Old Kona Airport State Recreation Area is the only developed State park. Activities at this 84-acre coastal park include picnicking, sunbathing, fishing, wading, tide-pooling, and surfing. Facilities include a special events pavilion and a jogging path.

Kekaha Kai State Park (formerly known as Kona Coast State Park) is a 1,700-acre park and wildlife sanctuary situated along the coast between the ahupuaa of Kukio to the north and Kaulana to the south. Facilities at the park are minimal with portable toilets and a graded, unpaved access road and parking area at Mahaiula. A conceptual plan for the park was developed in 1998, and will provide low intensity use of the park to preserve the unique natural, cultural and recreational resources of the area. Most of the limited facilities within the park, such as an activity center, Park Ambassador's residence, picnic facilities, restrooms and a dry botanical garden, will be concentrated at Mahaiula. Access roads and parking areas will be provided at both the northern and southern ends of the park near Kua and Mahai'ula Bays, respectively. Awakee will remain a wilderness area and Manini'owali will be an intermediate level activity area adjacent to the resort and residential developments of Kaupulehu and Kukio.

§12.5.8: South Kona

There are two 18-hole golf courses at Keauhou and a private 18-hole course at Puuanahulu, Makalei, and the Hualalai Resort.

The Honuauia Forest Reserve on the upper western slopes of Hualalai is used for limited wilderness recreation. No facilities are available and access roads are privately owned and in poor condition.

12.5.7.2 Courses of Action

- (a) Encourage the development of community and district recreational facilities, a gymnasium and community center with easy access for residents.
- (b) Encourage the development of Alii Drive within the Kailua Village area as a pedestrian mall with open space areas for passive recreation.
- (c) Improve facilities at Laaloa Bay Beach Park and Kahaluu Beach Park.
- (d) Implement the development of the Kailua Park (Old Kona Airport) as a major regional or district park.
- (e) Encourage the development of a major multi-purpose regional recreational and sports complex.
- (f) Acquire, and/or encourage the development of additional public shoreline recreation areas.
- (g) Establish public access to and the development of shoreline regions along the North Kona Coast in areas such as Keawaiki, Kiholo Bay, Kaupulehu, Kukio and Kapapa Bays, Kua Bay, Kahoiawa, Makalawena, and Honokohau.
- (h) Encourage the State to continue with the establishment of Kekaha Kai State Park reaching into Mahaiula, Awakee, and Maniniowali Ahupuaa.
- (i) Protect the marine life at Kahaluu Bay.
- (j) Protect Opaepa, Kaloko, and Honokohau (Aimakapa) Ponds as natural areas.
- (k) Encourage the development of historic trails.
- (l) Develop a municipal golf course.
- (m) Encourage the establishment of a historic park at Kamoia Point.
- (n) Encourage the acquisition and establishment of the summit area of Hualalai as a wilderness park.
- (o) Increase mauka park lands.

12.5.8 South Kona

12.5.8.1 Profile

In all of South Kona there is one district recreation center, the County's Arthur C. Greenwell Park (2.7 acres) in Captain Cook. Facilities include tennis and basketball courts, a newly developed playground, and a lighted playfield. Multipurpose facilities

§12.5.8: South Kona

at Sgt. Rodney J.T. Yano Memorial Hall are utilized by the County, individuals, and community organizations. Kona Scenic Park, a neighborhood park, has a baseball/football field, outdoor courts, and a restroom.

The Konawaena School in Kealahou has a swimming pool (County-owned and maintained), a gymnasium, baseball and football fields, four tennis courts, and an eight lane all-weather track. Communities in North Kona without recreation areas use this field. School yards at Hookena and Honaunau Schools are available for community use. Honaunau School has a small playfield used by community organizations and teams from as far away as Milolii. The playground and restrooms are available only during school hours. Hookena School has lighted basketball and volleyball courts and a small playfield. These are occasionally used by community teams.

There are four developed beach parks and two beach park reserves in the district. The County beach parks are small and have limited facilities. Milolii Beach Park (1.2 acres), on the old school grounds, has very limited facilities for camping, picnicking, fishing, and swimming. Hookena Beach Park (3.4 acres) is about 60 feet wide and 600 feet long with outstanding scenic qualities.

The Pu'uhoehoe O' Honaunau National Historic Park at Honaunau Bay consists of 182 acres and provides opportunities for fishing, swimming, and picnicking. There are also interpretive trails to significant historic sites. Tidepools are easily accessible and the offshore waters are excellent for snorkeling and diving.

An undeveloped beach reserve is located at Manini Point (5.6 acres) on the southern shore of Kealahou Bay. At the southeast shore of Kealahou Bay is the Hikiau Heiau State Monument (0.8 acres) that has been incorporated into the presently undeveloped Kealahou Bay State Historical Park. The State's Napoopoo Beach Park is located adjacent and to the south of the Hikiau Heiau.

Rich in coral and fish display, adjacent to the Captain Cook Monument, is the Kealahou Bay State Underwater Park consisting of 315 acres. The bay provides opportunities for snorkeling, scuba diving, and glass bottom viewing to observe the marine life in this underwater habitat.

The South Kona Forest Reserve consists of 23,322 acres and offers limited wilderness recreation accessible by a few trails.

12.5.8.2 Courses of Action

- (a) Expand and/or develop recreational facilities in existing communities.
- (b) Establish, in cooperation with the State Department of Education, additional recreational facilities at Konawaena, Honaunau, and Hookena Schools.

- (c) Encourage the development of a district recreation center with the cooperation of public and private agencies.
- (d) Encourage the development of the coastal area for public recreational use.
- (e) Encourage the development of a historic park at Kealakekua Bay and protect historic sites and scenic aspects of the area. Provide a conservation buffer around Kealakekua Bay.
- (f) Encourage the development of beach park reserves as natural areas and the improvement of existing beach parks.
- (g) Encourage the further development of Honaunau Bay as a historic park with recreational opportunities.
- (h) Encourage the development of Honomalino Bay as a beach reserve.
- (i) Encourage the development of Palemano Point and Hookena areas for public recreational opportunities.
- (j) Develop and provide cultural facilities and programs.

12.5.9 Ka'u

12.5.9.1 Profile

Naalehu Park, Waiohinu and Pahala community parks and their school yards provide community recreation areas. There is a plantation community center in Pahala and County community centers in Naalehu and Pahala that are used for community and private functions. In addition, there is a County swimming pool at the Ka`u High School campus in Pahala. Several neighborhood park sites have been reserved in subdivisions in the Kahuku area. The new Kahuku Park is on a four-acre site in Ocean View. The new park will include a ballfield, basketball court, playground, pavilion and restroom facilities.

There is a lack of beaches with safe swimming areas in the district. There are two developed beach parks in Ka`u: Whittington Beach Park (0.8 acre) in Honuapo Bay and Punaluu Black Sand Beach Park (6.0 acres). Swimming at Whittington Beach Park is hazardous due to rough seas. The area is scenic and used for picnicking, camping, and a rest stop for travelers. The black sand beach at Punaluu is an easily accessible swimming area that is heavily used. It is often crowded and has inadequate parking. The adjacent County park is located on a lava plateau on the southwest side of the bay.

South Point (Ka Lae) offers unique scenic landscape, historic sites, and good fishing. The Department of Hawaiian Homes Lands' Kamaoa park site, consisting of 28.8 acres, is undeveloped.

§12.5.9: Ka'u

Manuka State Wayside, a botanical garden with picnicking facilities, serves as a rest stop for travelers. The Kilauea State Recreation Area near the national park boundary in Volcano has one furnished cabin.

The Hawaii Volcanoes National Park consists of 229,176 acres and features geologic phenomena and wildlife. Facilities for picnicking and camping as well as good hiking trails are located throughout the park.

There are also forest reserves in the district, but they have poor access and lack facilities.

The 18-hole golf courses in the Ka'u district are located at Discovery Harbor, Volcano Country Club, and Punalu'u (SeaMountain). These golf courses are privately owned and open to the public.

12.5.9.2 Courses of Action

- (a) Encourage the development of a swimming facility in Naalehu.
- (b) Develop parks in Ocean View, commensurate with population growth.
- (c) Encourage the establishment of the Punaluu-Ninole Springs region as a recreation area.
- (d) Encourage the State Department of Hawaiian Homes Lands to develop the South Point area for recreational opportunities.
- (e) Recommend the development of Kaalualu Bay as a remote camping-beach park.
- (f) Encourage the State Department of Land and Natural Resources to develop wilderness recreation uses of the Kapua-Manuka Forest Reserve.
- (g) Encourage the restoration of Ninole Pond as a recreation area.
- (h) Encourage land acquisition surrounding Whittington Beach Park to allow for its expansion and the construction of a parking area.



TRANSPORTATION

13.1 OVERVIEW

13.1.1 Introduction and Analysis

Transportation is the systems and modes of conveyance of people and goods from place to place. It can be considered the major infrastructural element of an area. The different elements of the transportation system ideally need to be planned through an integrated and comprehensive process that includes land use planning. The coordinated planning of transportation facilities requires an understanding of the characteristics of the modes of conveyance and the patterns and densities of the area that they are intended to serve.

The purpose of transportation planning is to provide faster, safer, efficient and more pleasant travel, as limited by the ability to finance the cost of transportation. Because transportation systems are expensive to construct and maintain, great care and foresight are necessary when developing plans for its construction. Modern transportation planning emphasizes the total transportation system rather than isolated facilities. It considers all modes of transport which are economical in an area, as well as all types of improvements, including traffic engineering improvements.

The island is faced with an increasing demand for the development of new transportation facilities and systems. Over the past three decades, a number of major transportation projects have been completed, while many others are in the planning stage. Much of the current construction, however, is either expansion or improvement of existing systems of facilities. A sizable portion of the new construction either planned or underway is but an incremental part of a long-range program.

Since the adoption of the General Plan in 1971, the County has seen the construction of major highways, the expansion of its airport and harbor facilities and the establishment of a mass transit system. The 1970s saw the construction of the 35-mile long Queen Kaahumanu Highway (Highway 19) that provided access to the coastal areas between Kawaihae and Kailua-Kona. Since its opening in 1970, the runway and terminal facilities at the Kona International Airport at Keahole has been expanded to accommodate increased passenger traffic and international flights. The State has developed master plans for its highway, airport and harbor facilities to accommodate anticipated demands in the use of its facilities. Similarly, the State, in coordination with the County, prepared the Hawaii Long

§13.1.2: Goals

Range Land Transportation Plan (1998) that identified the island's major land transportation improvement needs to support the County's projected growth to the Year 2020.

Funding sources for future improvements may have to be expanded given decreasing Federal and State government capital expenditures. Traditionally, much of the funds for the major elements of the transportation system have come from these levels of government. In recent years, however, such funding has been declining and the financing of these improvements directly by the private sector may be required. These funding considerations will become more significant as the level of federal government financial support declines.

The different elements of a transportation system should be planned in conjunction with the overall land use plan of the County. To be effective, transportation planning as a "team task" requires the coordinated efforts of trained persons from a number of fields. Aside from these professionals, community participation, awareness and understanding are also vitally important.

13.1.2 Goals

- (a) Provide a transportation system whereby people and goods can move efficiently, safely, comfortably and economically.
- (b) Make available a variety of modes of transportation that best meets the needs of the County.

13.1.3 Policies

- (a) A framework of transportation facilities that will promote and influence desired land use shall be established by concerned agencies.
- (b) The agencies concerned with transportation systems shall provide for present traffic and future demands, including the programmed development of mass transit programs for high growth areas by both the private and public sectors.
- (c) The improvement of transportation service shall be encouraged.
- (d) Consider the provision of adequate transportation systems to enhance the economic viability of a given area.
- (e) Develop a comprehensive, islandwide multi-modal transportation plan that identifies the location and operation of automobile, mass transit, bicycle and pedestrian systems, in coordination with appropriate Federal and State agencies.
- (f) Work with various non-profit agencies to coordinate transportation opportunities.

13.1.4 Standards

- (a) Transportation systems shall meet the requirements of the U.S. Department of Transportation, State Department of Transportation and the County of Hawaii.
- (b) Transportation facilities and systems shall conform to the requirements of the Americans with Disabilities Act (ADA).
- (c) Transportation systems shall conform with design guidelines established by the American Association of State Highway and Transportation Officials (AASHTO)
- (d) The following sections on Roadways and Transportation Terminals are sub-elements of the overall transportation element.

13.2 ROADWAYS

13.2.1 Introduction and Analysis

The mobility of today's population is expected to increase. Population growth and increased car ownership will continue and will require additional measures for improving transportation facilities.

Roadways, as well as other elements of the transportation system, provide the connecting links between destination points.

In planning vehicular transportation, the various systems take into consideration activities or land uses that will continue to generate traffic. New major highways are expected to create new and productive land uses in appropriate locations. Roadways must be planned with other transportation elements, as all contribute to the total movement of people and goods.

The planning and design of roadways must also consider the area through which the corridor passes, the scenic vistas available, the potential for multiple uses of the right-of-way, and the impacts that may occur in the surrounding lands within the limits of feasibility and quality road design.

Roadway systems in Hawaii County are generally financed through Federal, State, and County programs. Recent funding limitations are reducing the availability of such monies. Consequently, additional sources will have to be sought to implement the needed improvements.

The County of Hawaii has 1,393 miles of public roads. This includes 394 miles of State highways and approximately 879 miles of County roads. Some of these roads do not meet present standards and require improvements. Of the approximately 879 miles of roads maintained by the County, 24 miles or 2.7 per cent are unpaved. There

§13.2.1: Introduction and Analysis

are also drainage and flooding problems along many highways and streets, as well as traffic congestion in some areas.

There are approximately 360 miles of primary and secondary arterials within the County that provide the major intra-island route between the major urban centers of Hilo, Kailua-Kona and Waimea and the major commercial airports and harbors. Major and minor collectors total approximately 200 miles. Local streets comprise about half of the total number of miles of public roads, or approximately 600 miles.

The County-owned and maintained roads as detailed in the previous paragraph do not include the many miles of homestead roads or “paper” roads throughout the island. Under the terms of the Highways Act of 1892 and Chapter 264, Hawaii Revised Statutes (HRS), all roads existing at the time of adoption of the Highways Act were declared to be public highways. In addition, public highways include all roads, alleys, streets, ways, lanes, bikeways, and bridges laid out on paper or built by the Territorial, State or County governments since 1892. A 1999 State Attorney General opinion clarified that all public highways are County highways unless declared by Chapter 264, HRS to be under State jurisdiction. The implications of this upon the County’s ability to effectively manage its roadway systems have not yet been clearly defined. What is clear is that additional resources are needed to fairly and adequately address the added responsibility of maintaining what the Department of Public Works estimates to be anywhere from 500 to 800 miles of homestead roads, many of which are unpaved and have not been maintained for many years. Assuming that the general public will not accept a large reduction in maintenance and repair activities of the other 1,000 miles of County-owned roads, additional funding is essential to systematically integrate the maintenance of these homestead roads into the Department of Public Works maintenance program.

The major highway systems on the island are the Hawaii Belt Highway and the Māmāloha Highway, which combined, link the major towns of all districts except North Kohala. This corridor has aspects of natural beauty that have often been overlooked. To alleviate the problem of distance between east and west Hawaii, a project planned by the Federal, State and County governments would improve the commute along the narrow and winding Saddle Road (Highway 200), the only paved road serving the astronomical observatories on Mauna Kea and Mauna Loa and the Pohakuloa Training Area. This project will upgrade and modernize the Saddle Road to Federal highway design standards and address conflicts in its shared use by the general public and the military. Once completed, the one-way commute time between East and West Hawaii could be reduced by twenty to thirty minutes.

With the cooperation of various State and County agencies and citizen advisory committees, the Long Range Land Transportation Plan for the Island of Hawaii was developed in 1998 to identify the major land transportation improvement needs to support the projected growth of the County to the Year 2020. Various State and County road-

§13.2.4: Standards

- (m) Develop minimum street standards for homestead and other currently substandard roadways that are offered for dedication to the County to ensure minimal levels of public safety.
- (n) Encourage the development of walkways, jogging, and bicycle paths within designated areas of the community.
- (o) Explore means and opportunities to enhance the shared use of the island's roadways by pedestrians and bicyclists, in coordination with appropriate government agencies and organizations.
- (p) The Bikeway Plan for the County of Hawaii (1979) shall be updated to include the development of a safe and usable bikeway system throughout the island.
- (q) Work in conjunction with the State to establish a clear agreement of the ownership and maintenance of the old homestead roads.
- (r) Develop short and long range capital improvement programs and plans for transportation that are consistent with the General Plan.

13.2.4 Standards

- (a) **Primary Arterial:** Includes major highways, parkways, and primary arterials that move vehicles in large volumes and at higher speeds from one geographic area to another; highest traffic volume corridor. Designed as a limited access roadway. Primary arterials shall have a minimum right-of-way of 120 feet.
- (b) **Secondary Arterial:** A street of considerable continuity that is primarily a traffic artery between or through large areas; interconnect with and augment primary system. Designed as a limited access roadway. Secondary arterials shall have a minimum right-of-way of 80 feet.
- (c) **Major Collector:** Any street supplementary to the arterial street system that is a means of transit between this system and smaller areas; used to some extent for through traffic and to access abutting properties; collect and distribute traffic between neighborhood and arterial system. Major collectors shall have a minimum right-of-way of 60 feet.
- (d) **Local Streets-commercial/industrial:** Local streets within commercial and industrial areas shall have a minimum right-of-way of 60 feet.
- (e) **Minor Collector and Local Streets:** Minor collectors are used at times as through-streets and for access to abutting properties. The principal purpose of a local street is to provide access to property abutting the public right-of-way.
- (f) These standards shall apply to new construction. The County shall determine standards for the dedication and upgrade of existing roads.

13.2.5 Districts

The following is an analysis by district with reference to roadways. The brief analysis of each district is intended to bring into focus the relationship of the district to the County as a whole.

13.2.5.1 PUNA

13.2.5.1.1 Profile

Primary routes within the Puna district are the Volcano Road (Highway 11), which provides access to Hilo and serves the upper Puna region; the Puna Road (Highway 130), serving lower Puna from Keaau to Kalapana-Kaimu; the Kapoho Road (Highway 132), from Pahoia to Kapoho; and the Puna Coast Road (Highway 137), linking Kapoho and Kalapana-Kaimu. The latter road is basically a narrow, paved cinder road. Recent upgrades have greatly improved Highway 130 from Keaau to Kalapana and Highway 11 from Hilo to Volcano. However, the majority of the roads throughout the district are inadequate by present standards. As the only two primary routes serving the district, Highway 130 and Highway 11 are congested during the work week for Hilo-bound traffic as the population in the district continues to grow. The recently completed Keaau By-Pass Highway re-directs Hilo- and Pahoia-bound traffic around the town of Keaau, avoiding the congested intersection of Volcano Highway-Keaau-Pahoia Road.

Many sections of the roads in this district have drainage systems that do not meet present standards or have sharp curves and grades without adequate sight distance. In several communities, buildings directly abut or encroach onto rights-of-way.

Most private roads in large subdivisions are cinder-surfaced and deficient in layout and construction. During the development of these large, substandard subdivisions in the 1950s and 1960s, limited attention was given to proper roadway base construction and drainage. There is also a network of private old plantation roads throughout the area.

13.2.5.1.2 Courses of Action

- (a) Explore the possibility of developing a mid-level roadway to be located makai of Highway 130, beginning at Hawaiian Beaches Subdivision and extending through Hawaiian Paradise Park Subdivision with its eventual connection to Railroad Avenue in South Hilo. Consider the establishment of a bikeway along the same alignment.
- (b) Consider, in conjunction with community associations and the property owners, the use of a variety of mechanisms to provide infrastructure in non-conforming subdivisions, beginning with the major roads providing access into the more densely populated subdivisions.

§13.2.5.2: SOUTH HILO

- (c) Encourage the State to widen Highway 130 to four lanes with a median and channelized intersections or modern roundabouts.

13.2.5.2 SOUTH HILO

13.2.5.2.1 Profile

The Hawaii Belt Highway (Highway 19) is the primary traffic artery serving the district outside of Hilo. Portions of the old Mamalahoa Highway serve scattered residential areas such as Pepeekeo and Honomu. Several narrow roadways cross-connecting the Hawaii Belt Highway and the old Mamalahoa Highway serve upper homestead areas. There is also an intricate system of private, former plantation roads.

Hilo is a terminal point for the island-circling Hawaii Belt Highway. Augmenting the Hawaii Belt Highway is the trans-island Saddle Road. The Saddle Road route within the city follows major thoroughfares that are congested, narrow, and/or winding. Planning and design is currently underway to improve and partially realign Highway 200 (Saddle Road) between Kaumana in East Hawaii and its connection to the Queen Kaahumanu Highway just south of Waikoloa in West Hawaii. The extension of Puainako Street in Hilo to connect with Highway 200 is currently in its planning stages and will ultimately provide the final link in a much improved and safer trans-island connector between East and West Hawaii.

Hilo's internal circulation system provides arterial and collector streets to handle traffic moving from one part of the city to another. However, except for Komohana Street below the mauka residential sections, the majority of the traffic flow in Hilo is forced through the downtown area because of the lack of arterial connections. High traffic volume is also generated around the Hilo High and Hilo Intermediate School complexes during peak traffic hours. Kawailani and Puainako Streets also experience high traffic volumes during peak traffic hours as students arrive at the various public schools located nearby. The Keaukaha area is served by a single main road, Kalani-anaole Avenue that is vulnerable to the threat of tsunamis in this low-lying area. A portion of this road has been recently widened and improved. However, the unimproved portion remains inadequate to accommodate the existing uses in the area.

The majority of the roads throughout the district do not meet present standards. Many sections of the roads have sharp curves and grades with relatively short sight distance. There are many streets with a maximum 40-foot right-of-way that is below present standard, and many more that do not have designed pedestrian areas, or that drain poorly and lack curbs, gutters or swales. In many instances, there is no major surface drainage system to handle the increased runoff brought about as new lands are opened for construction development.

§13.2.5.4: HAMAKUA

In addition to the roads paralleling the seacoast, many mauka-makai roads connect the lowlands to the upper homestead and agricultural belt. Many of these roads are maintained by the County but were also maintained by the now-defunct sugar companies. Continued maintenance of these former plantation roadways is a concern that the County and the affected residents along these roadways must strive to resolve.

13.2.5.3.2 Courses of Action

- (a) Restore and maintain existing homestead roads.
- (b) Encourage the State Department of Transportation to improve those portions of the Hawaii Belt Highway at Maulua, Laupahoehoe and Kaawalii Gulches.
- (c) Encourage the State Department of Transportation to realign that portion of the Hawaii Belt Highway at Kapehu Camp.
- (d) Encourage the State to install additional passing lanes at various sections along Highway 19.

13.2.5.4 HAMAKUA

13.2.5.4.1 Profile

The Hawaii Belt Highway is the primary traffic artery connecting Hamakua to the Hilo and Kohala districts.

Realignment and widening of the secondary road through Honokaa and its continuation to Waipio Valley is complete. The pattern of circulation in Honokaa is overly dependent upon Mamane Street, the only roadway providing access through the town. There is a lack of parallel loop circulation routes and most of the local traffic is on Mamane Street or sub-streets that branch off the main street. However, because of the sloping topography and the water courses dividing Honokaa into separate areas, it is difficult to develop loop circulation systems without constructing a number of bridges.

In addition to the roads mentioned, there are several homestead roads mauka of the Hawaii Belt Highway serving the Paaulo, Pohakea, Kaapahu, Kalopa, Kaa, and Ahualoa Homestead lands. These roads, however, are narrow and in poor condition. There is also a network of private former plantation roads.

13.2.5.4.2 Courses of Action

- (a) Encourage the State to install additional passing lanes along Highway 19 at appropriate locations.
- (b) Provide for an industrial traffic connection leading from the former sugar mill to Highway 19, separating this traffic from local traffic movement on Mamane Street.

§13.2.5.5: NORTH KOHALA

- (c) Encourage the State to construct a scenic highway from the Waipio Valley look-out extending mauka to connect to Mud Lane at the entrance of Waimea.
- (d) Improve County maintained roads and encourage the improvement of non-county owned roads by the State of Hawaii or private landowner.
- (e) Consider alternatives in the management of Pakalana Street, such as its conveyance to the State Department of Education or its conversion to a one-way traffic pattern.
- (f) Provide a cross-town connection to Plumeria Street by extending Kamani Street.
- (g) Provide a mauka-makai connection from the Kamani Street extension to Mamane Street on the Hilo side of the elderly housing.
- (h) Eliminate the Milo Street extension on the Waipio side of Pakalana Street.

13.2.5.5 NORTH KOHALA**13.2.5.5.1 Profile**

There are two roads leading into North Kohala, the Kohala Mountain Road and the Akoni Pule Highway. The mountain route to Kohala has sharp vertical and horizontal curves and grades with relatively short sight distance. The urban areas of this district are scattered along the main road between Hawi and Niulii, a distance of nearly seven miles. There is also an intricate system of former plantation roads.

13.2.5.5.2 Courses of Action

- (a) Encourage the improvement of the Kohala Mountain Road.
- (b) Encourage the improvement of that portion of the Akoni Pule Highway between the towns of Hawi to Niulii.
- (c) Improve mauka-makai county maintained homestead roads and encourage improvement of the non-county owned roads by the State of Hawaii or private subdivisions.

13.2.5.6 SOUTH KOHALA**13.2.5.6.1 Profile**

The primary highway that runs through the town of Waimea is the Mamalahoa Highway. Recent improvements to this section of the highway have significantly improved the traffic flow through Waimea town. However, the narrow and winding sections of Mamalahoa Highway from Waimea to still require improvements. The Akoni Pule Highway extends from Kawaihae in South Kohala to the towns of Hawi, Kapau and Niulii in North Kohala.

Studies are on-going for the construction of a new bypass highway around the town of Waimea (Waimea Bypass) and a new road from Waimea to Kawaihae (Kawaihae

§13.2.5.7: NORTH KONA

Road Realignment). Construction of these transportation segments will be needed to accommodate the anticipated expansions of resort areas along the coast, commuter traffic from Hamakua and Waimea and the transportation of goods to and from the Kawaihae Harbor.

Preliminary designs for the realignment of the Saddle Road indicate that its proposed connection with the Mamalahoa Highway (Highway 190) will be located approximately 8 miles south of its current intersection or 3 miles to the south of the Mamalahoa Highway-Waikoloa Road intersection. From this intersection, the Saddle Road will continue makai along the South Kohala-North Kona District boundary to its ultimate connection with the Queen Kaahumanu Highway.

13.2.5.6.2 Courses of Action

- (a) Improve existing homestead roads.
- (b) Encourage the construction of a Waimea by-pass road from Mud Lane to Mamalahoa Highway on the Kona side of Waimea.
- (c) Encourage the construction of connector roads from the Waimea Bypass Road to the Mamalahoa Highway.
- (d) Encourage the construction of a new Waimea to Kawaihae road from Mamalahoa Highway to the Queen Ka'ahumanu Highway.
- (e) Encourage the widening of Queen Ka'ahumanu Highway as the need arises.
- (f) Support the installation of suitable bikeways and/or jogging paths.
- (g) To relieve traffic congestion through Waimea town, implement construction of a) Parker Ranch's connector road from Kamamalu Street to Mamalahoa Highway; and b) the County's extension of this road, between Mamalahoa Highway and Kawaihae Road in the vicinity of the Waimea solid waste transfer station.
- (h) Construct, at a minimum, one other paved two-lane access road out of the Ke Kumu Housing area onto Paniolo Drive.
- (i) Extend Paniolo Drive in Waikoloa north to intersect with the Kawaihae Road and the proposed Waimea-Kawaihae Road, and build a road connecting the northern end of Paniolo Drive to the Queen Kaahumanu Highway to provide alternate access to Waikoloa Village.
- (j) Provide traffic signals at the Waikoloa Road-Paniolo Drive intersection.

13.2.5.7 NORTH KONA

13.2.5.7.1 Profile

The major traffic arteries serving the North Kona district are the Hawaii Belt Highway connecting Kona with South Kohala and Ka'u, the Queen Ka'ahumanu Highway, the Kuakini Highway connecting Kailua with the mauka Keauhou area, and Alii Drive serving the shoreline areas between Kailua and Keauhou. The latter of these systems

§13.2.5.8: SOUTH KONA

- (g) Connect Keanalehu Drive to Manawalea Street to create a connection between Kealakaa Street and Kealakehe Parkway.
- (h) Connect Kamanu Street ("Main Street") between Kealakehe Parkway and Costco, then extend north to proposed University Drive.
- (i) Construct Village Bypass from Alii Drive to Kuakini Highway, and from Kuakini Highway to Hualalai Road to meet with Nani Kailua Drive.
- (j) Realign the intersection of Kealakaa Street and Palani Road.
- (k) Connect Kanalani Street to Keanalehu Drive.
- (l) Connect Hienaloli Road from Palani Road to Hualalai Road.
- (m) Connect Puapuaanui Street from Queen Kaahumanu Highway to Hualalai Road.
- (n) Encourage the State to widen the Queen Kaahumanu Highway from Henry Street to Kamehameha III Road.
- (o) Construct the proposed University Drive between the Mamalahoa and Queen Kaahumanu Highways.
- (p) Construct the proposed Shore Drive from the Old Kona Airport Park to the Kealakehe Drive intersection.
- (q) Construct the Kahului-Keauhou Parkway (Alii Highway) from Queen Kaahumanu Highway to Keauhou.
- (r) Construct the Mamalahoa Bypass Highway between Keauhou and Captain Cook as a Scenic Corridor, with limited access and without commercial development.
- (s) Provide vertical connectors from Alii Drive to Kuakini Highway.
- (t) Improve that portion of the Mamalahoa Highway extending from the North Kona to the Ka'u Districts.
- (u) Support the installation of suitable bikeways and/or jogging paths.
- (v) Develop a roadway circulation plan for the area between Palani Road and Kamehameha III Road, in cooperation with the State Department of Transportation, Federal Highway Administration, and the affected communities.
- (w) Extend Lako Street to connect to Alii Drive.
- (x) Work with the State and the adjacent landowners in establishing the old railroad right-of-way as a pedestrian and bicycle right-of-way.

13.2.5.8 SOUTH KONA

13.2.5.8.1 Profile

The Mamalahoa Highway is the only arterial roadway currently serving all of the South Kona District. Many portions of this roadway are narrow and winding. Lands mauka and makai of this roadway are served by private and County-owned collector roadways, many in poor condition.

§13.2.5.9: KA'U

Plans are underway for the construction of the new Mamalahoa Highway Bypass Road, which will extend the proposed Kahului-Keauhou Parkway from its terminus at Keauhou, North Kona south to the intersection of Mamalahoa Highway and Napoopoo Road in Captain Cook, South Kona, a distance of approximately five miles. Upon its completion, the combined Alii Highway and Mamalahoa Highway Bypass Road will provide a new north-south alignment from Kailua-Kona to Kealahou, relieving traffic congestion along the existing Mamalahoa Highway between the communities of Honalo and Captain Cook. The bypass road is being constructed by the developers of the proposed 730-unit Hokuli'a agricultural subdivision as a requirement of the project's approval by the Hawaii County Council.

13.2.5.8.2 Courses of Action

- (a) Extend Haleki'i Street to connect to the proposed Mamalahoa Bypass Highway.
- (b) Develop a roadway network circulation plan for South Kona in cooperation with the State Department of Transportation and affected communities. Upon adoption of the plan by the County, the recommendations shall be incorporated on the zone district maps.
- (c) Construct the Mamalahoa Bypass Highway between Keauhou and Captain Cook as a Scenic Corridor, with limited access and without commercial development.
- (d) Improve that portion of the Mamalahoa Highway extending from the North Kona to the Ka'u Districts.
- (e) Support the installation of suitable bikeways and/or jogging paths.
- (f) Establish a Heritage Corridor on Old Mamalahoa Highway between Hualalai and Honaunau.
- (g) Improve substandard, rural roads.

13.2.5.9 KA'U**13.2.5.9.1 Profile**

The primary highway through the Ka'u district is the Mamalahoa Highway. Certain portions of this highway system are narrow with sharp vertical and horizontal curves and relatively short sight distance. Flooding also occurs in certain areas. This district also has an intricate system of former plantation and older subdivision roads. The majority of the private roads in the large subdivisions are cinder-surfaced and/or oil-treated and lack adequate maintenance.

13.2.5.9.2 Courses of Action

- (a) Continue to improve Mamalahoa Highway, realigning where necessary.
- (b) Install culverts and construct drainage channels and other related improvements.
- (c) Encourage the improvement of substandard subdivision roads.

- (d) Explore alternatives and means to establish an evacuation route through Hawaiian Ocean View Estates Subdivision to Highway 11, in cooperation with the residents of Ocean View.

13.3 TRANSPORTATION TERMINALS: AIRPORTS & HARBORS

13.3.1 Introduction and Analysis

The principal concerns of planning for transportation terminals are location, provision of adequate transportation connections to terminals, financing and programming of improvements and services through Capital Improvement Projects, and the planning and zoning of adjacent land uses.

Although the State Department of Transportation is responsible for the actual design, construction and operation of terminals and supporting facilities, the General Plan addresses the location of these facilities in relation to the pattern of overall land uses.

Major transportation terminals in the County of Hawaii consist of harbors and airports. There are two deep draft harbors on the island, one at Hilo and another at Kawaihae. While improvements continue to be made, both harbor terminals lack adequate docking and support facilities. Water pollution is a continuing problem in the vicinity of the harbors. It is anticipated that the use of both deep draft harbors will expand substantially. Cargo volume at Kawaihae Harbor has increased significantly as the population and development in West Hawaii continues to grow. The Hawaii Commercial Harbors 2020 Master Plan was developed by the State in 1998 to guide the development, maintenance and enhancement of the island's harbor systems to ensure its efficient, safe, accessible and economical operations.

Facilities for small boats, such as launching ramps, have been developed in various parts of the County. Those that provide refuge are discussed to a limited extent in this element. For the most part, they are addressed in the Recreation element.

Air terminals that service inter-island transportation are located at Hilo, Waimea, Upolu, and Kona. The terminals at Hilo and Kona are overseas facilities. Oversea flights at the Kona International Airport at Keahole will continue to increase with the growth of resort areas in Kona and Kohala. Overseas flights through Hilo International Airport have been important to agriculture in East Hawaii. However, the facility is currently underutilized by overseas passenger carriers. The statewide need for a second gateway, especially for cargo, still exists. The proximity of Hilo's airport and harbor offer a number of opportunities for centralized distribution. Plans are currently underway to construct a new cargo facility at Hilo International Airport to centralize cargo operations at a location closer to terminal facilities.

§13.3.2: Goal

The airstrip at Upolu Point in North Kohala is used as a general aviation field. The Waimea-Kohala airport is underutilized, but its use may increase with resort development in South Kohala. Except for small private landing strips developed to serve the former sugar plantations, there are no airfields in Puna, Ka'u or South Kona. There may be an increase in demand for airstrips and helipads stemming from the growth of the visitor industry. The State, in coordination with the County and the affected communities, has been developing master plans for each of the four airport facilities to assess current and future demand as well as specific recommended improvements.

As population becomes more mobile and as resident and visitor populations increase, there will be a greater demand for new and expanded transportation facilities.

The following goal, policies, and standard are set forth to guide the orderly development of the County's transportation terminals and related facilities.

13.3.2 Goal

- (a) Provide transportation terminals and related facilities for the safe, efficient and comfortable movement of people and goods.

13.3.3 Policies

- (a) Encourage the programmed improvement of existing terminals, including adequate provisions for control of pollution and appropriate and adequate covered storage facilities for agricultural products.
- (b) The State Department of Transportation should continue to implement its plans for transportation terminals and related facilities to promote and influence desired land use policies.
- (c) Transportation terminals should be developed in conjunction with the different elements of the overall transportation system.
- (d) Encourage maximum use of the island's airport and harbor facilities.
- (e) Encourage the development, maintenance, and enhancement of Hilo and Kawaihae Harbors as detailed within the State's Hawaii Commercial Harbors 2020 Master Plan.
- (f) Support the State's objectives to acquire rights within the runway clear-zones, limit heights within approach zones, and restrict noise-sensitive uses within designated noise contours determined by the State.

13.3.4 Standards

- (a) Requirements of the State Department of Transportation.
- (b) Federal Aviation Administration standards for airport design, runway clear zones, and noise compatibility.

§13.3.5: Districts

- (c) State Department of Land and Natural Resources Standards for small boat harbors and boat launches.

13.3.5 Districts

The following is an analysis by district with reference to transportation terminals. The brief analysis of each district is intended to bring into focus the relationship of the district to the County as a whole.

13.3.5.1 PUNA

13.3.5.1.1 Profile

There are several small private aircraft landing strips developed by the former sugar industry for use by "crop-dusting" single engine aircraft.

The County has purchased twenty-two acres of land on the mauka side of Isaac Hale Beach Park for the construction of additional car and boat parking areas, playgrounds, picnic and bathroom facilities to supplement the heavily used boat launching facilities at Pohoiki.

13.3.5.1.2 Courses of Action

- (a) Provide general aviation and small boat harbor facilities as the need arises.
- (b) Provide another small boat launching facility at Kapoho.

13.3.5.2 SOUTH HILO

13.3.5.2.1 Profile

Hilo Harbor is one of two major, deep draft harbor facilities on the island. The present harbor has a 35-foot deep draft and three commercial piers. There is limited loading or back-up space. There also is limited land area for the expansion of harbor-oriented industrial uses. The number of cruise ship passengers visiting Hilo has increased dramatically during the 1990's and there is a need to improve the accommodations for these passengers at the harbor. The Hawaii Commercial Harbors 2020 Master Plan recognizes the limited expansion opportunities for Hilo Harbor and the need to accommodate increased cargo and passenger volumes. In addition to specifying recommended cargo yard acreages, berthing requirements and roadway improvements, the plan also recommends the construction of a passenger terminal facility at Pier 5 to accommodate the growth of cruise ship arrivals.

Within Hilo Harbor, Radio Bay has limited facilities for small boats. The State Department of Transportation also maintains small boat facilities at the mouth of the Wailoa River.

§13.3.5.3: NORTH HILO AND HAMAKUA

Hilo International Airport serves inter-island and occasional overseas air traffic. The airport facilities are currently underutilized. The close proximity of Hilo's airport and harbor may potentially be utilized to the County's advantage. Both transportation facilities are surrounded by or near State-owned lands that could be used for support services and facilities. Hilo is fourth to Honolulu, Barbers Point, and Kahului in the amount of cargo handled through both its airport and harbor. There may be an opportunity for the development of a centralized cargo distribution center within Hilo that could eventually alleviate congested conditions on Oahu. Such a distribution center could eventually serve other neighbor islands by distributing and marshalling cargo both from and to the mainland.

Hilo International Airport has a runway length of 9,800 feet, capable of accommodating aircraft as large as the Boeing 747. However, the current runway length imposes some take-off weight restrictions. To accommodate maximum-rated cargo payloads to the West Coast would require a runway length of up to 12,000 feet. Until such time that a major cargo facility is constructed at the Hilo International Airport, extension of the existing runway will not be needed.

13.3.5.2.2 Courses of Action

- (a) Under the guidance of the Federal government, the State Department of Health should enforce and strengthen present pollution regulations.
- (b) The State Department of Transportation should continue to improve facilities at Hilo Harbor to meet increased shipping activities and cruise ship passenger arrivals.
- (c) Future land uses in the vicinity of the Hilo International Airport should have an adequate open space buffer and/or be compatible with the anticipated aircraft noise exposure levels for that vicinity.
- (d) Encourage the construction of an Agricultural Processing and Packing Center at the old Hilo Airport, the planning of which shall be coordinated with future development plans for Hilo Harbor.
- (e) Encourage the construction of a centralized air cargo distribution complex at the Hilo International Airport.
- (f) Encourage development of a small boat harbor for the area.

13.3.5.3 NORTH HILO AND HAMAKUA**13.3.5.3.1 Profile**

There are no air or harbor terminals in these districts. The only small boat ramp on the Hamakua Coast is located within the Laupahoehoe Point Beach Park. Although the boat ramp was improved through a joint effort of the County of Hawaii and the U. S.

§13.3.5.4: NORTH KOHALA

Army Corps of Engineers, it is inadequately protected from damage due to storm surges. Without further improvements, the ramp will continue to be hazardous for users of the facility.

13.3.5.3.2 Course of Action

- (a) Continue to improve the small boat ramp at Laupahoehoe, extend the offshore protective structure, and provide for adequate parking.

13.3.5.4 NORTH KOHALA

13.3.5.4.1 Profile

Upolu airfield is the only air transportation facility in the district. It is used on a limited basis. The State prepared the Upolu Airport Master Plan in 1999 to forecast aviation demand at the facility to the Year 2020 and to evaluate the need for additional facility improvements. Based on forecast demand, no extension of the existing runway or expansion of terminal facilities will be required during the study period. However, it recommends the acquisition of lands adjacent to the airport for future runway and terminal expansion. The widening of the airport's existing 1.8 mile access road to a two-lane, paved road is also recommended.

13.3.5.4.2 Courses of Action

- (a) Retain Upolu airfield for general aviation use.
- (b) The State should continue to provide improvements to runway and terminal facilities at Upolu Airport, including the improvement of the airport's access road from the Akoni Pule Highway.

13.3.5.5 SOUTH KOHALA

13.3.5.5.1 Profile

There is a deep draft port and small boat harbor at Kawaihae, both of which are being further improved. Kawaihae Harbor has two commercial piers with approximately 14 acres of cargo handling and storage areas, with room for expansion as needed. Although a new perimeter breakwater was constructed at the southern end of the harbor by the Army Corps of Engineers, there is insufficient parallel docking space at the present facility. The State Department of Transportation has plans to increase small boat capacity when funding can be appropriated. The Hawaii Commercial Harbors 2020 Master Plan identifies the need for additional cargo yard space to accommodate interisland and overseas cargo as well as the construction of a passenger terminal at Pier 4.

Opened for air service in 1953, the Waimea-Kohala Airport provides commuter air service, air cargo and air ambulance service to the residents of North and South Koha-

§13.3.5.6: NORTH AND SOUTH KONA

la as well as Hamakua. Other users of the airport include the military, private aircraft owners and flight training schools. The State prepared the Waimea-Kohala Airport Master Plan in 1999 that forecasted aviation demand and facility needs to the Year 2020. While use of the facility by current users is expected to increase during the study period, commercial interisland and overseas flights will remain at the international airports in Hilo and Kona. In general, the master plan recommends various improvements and upgrades to the runway and terminal facilities to improve operating efficiencies and increase aircraft load capacity.

13.3.5.5.2 Courses of Action

- (a) The State Department of Transportation should continue to provide improvements to terminal and runway facilities at the Waimea-Kohala airport.
- (b) The State Department of Transportation should continue to improve harbor facilities at Kawaihae to meet increased shipping activities and cruise ship passenger arrivals.
- (c) Continue to support the Department of Land and Natural Resources in its plans to develop a small boat harbor at Kawaihae.

13.3.5.6 NORTH AND SOUTH KONA**13.3.5.6.1 Profile**

The Kona International Airport at Keahole, which began operations in July 1970, was built in the midst of a barren lava field. The inter-island terminal has a Polynesian motif that received a design award for excellence in 1985. Direct flights from the mainland to Keahole began in 1985; direct flights from Japan began in 1996, and the number of inter-island flights have increased. Kona International Airport at Keahole is one of two principal entry points for visitors to the Big Island. In 1994, the airport runway was extended from 6,500 to 11,000 feet in length to accommodate aircraft as large as the Boeing 747.

The State developed its Keahole-Kona International Airport Master Plan in 1987 to provide a guide for the location, design and construction of future facility improvements at the airport. A Master Plan Update Study prepared in 1997 supplemented the original master plan to identify facility needs to the Year 2015. With the expansion of the visitor industry in West Hawaii, the airport has and will continue to experience growth in passenger arrivals, aircraft operations and cargo/mail activities. Annual passenger volume is anticipated to increase by 51 per cent to approximately 3.5 million in 2015. The master plan details land use, terminal improvements, access and circulation, and supporting infrastructural needs to accommodate future facility needs. Some of the improvements include an expanded air cargo facility and new overseas terminal, flight kitchen, postal facility and general aviation facilities.

§13.3.5.7: KA'U

Aside from the small boat harbors at Kailua, Keauhou, and Honokohau, there are no shipping terminals in the district. Improvements to Honokohau small boat harbor have been made incrementally. Cruise ships visiting Kailua-Kona currently anchor about one-third mile offshore of Kailua Bay and shuttle their passengers to Kailua-Kona Wharf. A visitor information booth is the only visitor-related accommodation provided at the wharf. Funding for a \$3.5 million refurbishment of the Kailua-Kona Wharf was approved by the 2000 State Legislature with construction anticipated to be completed before the end of 2003.

13.3.5.6.2 Courses of Action

- (a) Future land uses in the vicinity of the Kona International Airport at Keahole should be compatible with the anticipated aircraft noise exposure levels for that vicinity.
- (b) The State Department of Transportation should continue to improve and expand Kona International Airport at Keahole in accordance with the recommendations of the Keahole-Kona International Airport Master Plan Update Study (1997).
- (c) Encourage the State to renovate the Kailua-Kona Wharf or to seek alternative facilities to accommodate the cruise ship industry.

13.3.5.7 KA'U

13.3.5.7.1 Profile

There are presently no terminal facilities in Ka'u. However, there will be need for general aviation and small boat harbor facilities should growth within the district demand such facilities.

13.3.5.7.2 Course of Action

- (a) Provide for general aviation and small boat harbor facilities and launching activities as the need arises.

13.4 MASS TRANSIT

13.4.1 Introduction and Analysis

The County is committed to providing its residents with a public transportation system that is affordable, efficient, accessible, safe, environmentally friendly, and reliable. Mass transit systems provide residents with an alternative means of transportation to employment, services and activities. It also promotes and enhances pedestrian activities, reduces congestion, improves air quality, and increases economic development opportunities.

§13.4.2: Goal

The County's Mass Transit Agency was created to provide mass transit service on this island. The County currently operates the Hele-On bus system with a fleet of 28 buses, each with a capacity of 33 or 45 passengers. Eleven of these buses are wheelchair accessible. Approximately 10 per cent of the cost to operate the buses is Federally funded with the remainder funded by the County. Approximately 55 per cent of the County's operational costs are derived from fare revenues with the remainder from general revenues.

The Hele-On provides service along the main roadways serving the major urban centers of the island. Within Hilo, there are three additional routes serving the Waiakea-Uka, Downtown Hilo, and Kaumana areas. Within the Kona District, a shuttle operates between Kailua, Keauhou and Kealahou. The Hawaii Long-Range Land Transportation Master Plan recommends that additional routes be provided to link Waimea town and the towns in North Kohala with Kailua-Kona and the resorts located along the South Kohala coast.

In addition to the Hele-On, the County also offers a shared-ride taxi service that provides door to door service within the urban areas of Hilo and Kailua-Kona. This program allows the public to purchase coupons and use the coupons instead of cash with participating taxi companies. The program allows a user to submit one coupon (at a cost of \$2) to travel up to four miles and two coupons to travel up to nine miles. The Hawaii County Economic Opportunity Council, a non-profit community action agency, supplements the County's bus services by providing bus services for the low-income, elderly, disabled, and pre-school children who attend Head Start schools.

13.4.2 Goal

- (a) Provide residents with a variety of public transportation systems that are affordable, efficient, accessible, safe, environmentally friendly, and reliable.

13.4.3 Policies

- (a) Improve the integration of transportation and land use planning in order to optimize the use, efficiency, and accessibility of existing and proposed mass transportation systems.
- (b) Support and encourage the development of alternative modes of transportation, such as enhanced bus services and bicycle paths.
- (c) Incorporate, where appropriate, bicycle routes, lanes, and paths within road rights-of-way in conformance with The Bikeway Plan for the County of Hawaii.
- (d) Provisions to enhance the mobility of minors, non-licensed adults, low-income, elderly, and people with disabilities shall be made.

13.4.4 Standards

- (a) American Association of State Highway and Transportation Officials (AASHTO), Guide for the Development of Bicycle Facilities.
- (b) U.S. Department of Transportation, Federal Highway Administration, Manual on Uniform Traffic Control Devices (MUTCD).



LAND USE

14.1 OVERVIEW

14.1.1 Introduction And Analysis

The General Plan expresses both the integrated and specific concerns and problems as well as alternative solutions and guidance regarding the use of County resources. Land use is one of the principal focal points of public concern and policy. The other study elements of the General Plan, that depict the various aspects of the County, directly involve land use in varying degrees.

The land use element sets forth goals, policies, and standards to guide the location and density, and building intensities of land uses in particular areas. Regional and/or Community Development Plans are intended to implement the broad goals within the General Plan on a regional basis. They serve to designate and coordinate detailed development patterns and infrastructure needs throughout the County. The Plans detail land use policies and infrastructure priorities, transportation, recreation and other major land use policies within each area, and must be developed with participation by the affected communities and adopted by ordinance by the County Council.

The land use element is intended to be used as a policy guide for the coordinated growth and development of the County. It seeks to accommodate growth without congestion; to designate and preserve the lands needed for residential use, commercial and visitor services, industry, agriculture, and open space; and coordinate these uses with the County's service and circulation systems.

The total area of the island of Hawaii is approximately 2.5 million acres or 4,028 square miles: 4,023 square miles of land and 4.4 square miles of inland water. All of these lands are divided into approximately 125,000 parcels.

Previous General Plans

The first General Plan for the County of Hawaii, adopted in 1965, was a compilation of three separate documents: A Plan for the Metropolitan Area of Hilo, A Plan for Kona, and The Kohala-Hamakua Region General Plan. The first General Plan provided for the general planning for all districts except Ka'u.

§14.1.1: Introduction And Analysis

In 1971, the County adopted its first comprehensive General Plan that provided for the general planning of all nine judicial districts on the island. Included within this General Plan was a requirement for ten year comprehensive reviews and updates to the General Plan. The first of these comprehensive reviews and updates resulted in the adoption of the first comprehensive revision to the General Plan in 1989 that updated supporting information, the Land Use Pattern Allocation Guide and Facilities maps, and the various study elements.

Several other documents are used in local planning including regional and functional plans, the Zoning Code and Subdivision Code. These are specific and detailed pieces of legislation and plans intended to carry out the goals, policies, standards and courses of action of the General Plan.

State Land Use

Hawaii was the first of the fifty States to have a State Land Use Law and a State General Plan. Today, Hawaii remains unique among the fifty states with respect to the extent of control that the State exercises in land use regulation. Some of the actions leading to the passage of the State Land Use Law resulted from concerns and discussions predating World War II. In the post-World War II period, there was a perception that government action to control land uses was desirable because of the very limited area of the islands. It was also perceived that development of land for urban uses in many cases tended to occur in areas where it was uneconomical for public agencies to provide proper and adequate service facilities, and that there was a consequent lag in the provisions of such facilities. Further, there was a perception that development of land for urban uses in many cases occurred on land having a higher capacity for contributing to the basic economy of the State, namely agriculture, than the uses that were developed thereon.

The passage of the Land Use Law in 1961 established the State Land Use Commission. It called for the classification of all lands in the State and authorized the adoption of rules of practice and procedures and regulations for land use within the various State land use districts.

The four land use districts created by the State Land Use Commission provide the basic legal framework for land uses in the State of Hawaii. The Urban District is generally defined as lands in urban use with sufficient reserve to accommodate foreseeable growth. In the County of Hawaii this district is comprised of approximately 54,267 acres or two per cent of the island's total land area. Rural Districts are defined as lands primarily comprised of small farms mixed with low density residential lots that have a minimum lot size of one-half acre under the State Land Use Law. Of the four districts, this is the smallest, with approximately 807 acres of the island's total land area. The Agricultural District includes lands with a high capacity for intensive cultivation as well as those with low capacity. The minimum lot size in this district under the State

Land Use Law is one acre. The Agricultural District has the second greatest land area with approximately 1,184,599 acres or slightly over 46 per cent of the total land area of the island. Conservation Districts are primarily those lands in the existing forest and water reserve zones. This district has the largest land area with approximately 1,338,135 acres or 52 per cent of the total land area of the island.

Land uses within the Urban Districts are administered exclusively by the counties. In the Agricultural and Rural Districts, the State Land Use Commission establishes use regulations and the counties are responsible for their administration. The counties, however, may adopt more stringent controls than those imposed by the State within these two districts. Land use in the Conservation District is regulated by the State Board of Land and Natural Resources, except that the County has concurrent permitting power within the Special Management Area near the coast. The County has no land use control over Federal property, and the Hawaiian Homes Commission has the ultimate control over uses of the Hawaiian home lands leased to native Hawaiians.

Table 14-1. State Land Use Districts Acreage by Judicial Districts, (as of May 2000)

| Judicial Districts | Agricultural | Conservation | Rural | Urban | Total |
|--------------------|--------------|--------------|-------|--------|-----------|
| Puna | 175,104 | 138,563 | 146 | 6,329 | 320,142 |
| South Hilo | 70,695 | 169,493 | 0 | 12,814 | 253,002 |
| North Hilo | 53,587 | 120,110 | 71 | 608 | 174,376 |
| Hamakua | 162,729 | 235,805 | 13 | 1,041 | 399,588 |
| North Kohala | 64,713 | 13,187 | 16 | 2,434 | 80,350 |
| South Kohala | 150,426 | 15,356 | 53 | 10,608 | 176,443 |
| North Kona | 158,853 | 188,331 | 477 | 17,787 | 365,448 |
| South Kona | 110,749 | 35,051 | 31 | 845 | 146,676 |
| Ka'u | 237,743 | 422,239 | 0 | 1,801 | 661,783 |
| Total | 1,184,599 | 1,338,135 | 807 | 54,267 | 2,577,808 |

State of Hawaii, DBEDT, Office of Planning GIS Data
 County of Hawaii Planning Department

County Zoning

The Zoning Code for the County of Hawaii is the legal instrument that regulates the use of land. The Zoning Code implements the General Plan and is a document dealing with existing conditions and shorter range needs. The Zoning Code is the County’s primary land use control. The Zoning Code implements the General Plan. It deals with existing conditions and shorter range needs. The Zoning Code sets out the various types of zoning districts and the allowable uses for each. Zoning maps, established by ordinance, set out the zoning for the island on a parcel-by-parcel basis.

§14.1.1: Introduction And Analysis

Rezoning is the primary method for changing the allowed uses of land. Rezoning must be consistent with the General Plan, including the Land Use Pattern Allocation Guide Map. Other factors beside the map consistency must be taken into account during the rezoning process, which requires specific consideration of a number of factors to determine the suitability of the property for the proposed zone. These include proximity to roads, utilities, and public services, environmental factors such as drainage, slope, and soil types, and other public concerns.

The tabulation of zoned lands based on the County zoning as of December 2000 is as follows:

- Single-family residential: 20,189 acres
- Multiple residential (including duplex): 3,065 acres
- Resort: 1,353 acres
- Commercial: 2,859 acres
- Industrial: 6,039 acres
- Industrial-Commercial Mixed: 27 acres
- Family Agriculture: 100 acres
- Residential-Agriculture: 2,105 acres
- Agricultural: 1,219,773 acres*
*includes lands changed from Unplanned to Agriculture as part of the 1996 amendments to the Zoning Code
- Open: 317,262 acres.
- Project District: 1,748 acres
- Agricultural Project District: 23 acres
- Lands not zoned (includes Forest Reserves and National Parks): 933,842 acres

Table 14-2. Number of Acres Zoned Per District in 1989

| Zoning | Puna | South Hilo | North Hilo | Hama-kua | North Kohala | South Kohala | North Kona | South Kona | Ka'u | Total |
|-------------------------|---------|------------|------------|----------|--------------|--------------|------------|------------|---------|-----------|
| Single Family | 2,684 | 7,645 | 391 | 636 | 616 | 3,099 | 2,254 | 390 | 783 | 18,498 |
| Multi-Family | 4 | 380 | 0 | 4 | 43 | 1,109 | 1,029 | 0 | 101 | 2,670 |
| Resort | 1 | 138 | 0 | 0 | 0 | 350 | 742 | 0 | 45 | 1,276 |
| Commercial | 60 | 975 | 10 | 37 | 38 | 329 | 314 | 101 | 59 | 1,923 |
| Industrial | 479 | 2,182 | 38 | 15 | 59 | 241 | 2,245 | 0 | 52 | 5,311 |
| Residential Agriculture | 625 | 0 | 55 | 0 | 20 | 0 | 468 | 144 | 0 | 1,312 |
| Agriculture | 198,796 | 71,359 | 61,954 | 165,076 | 62,958 | 79,493 | 116,184 | 44,363 | 252,620 | 1,052,803 |
| Open | 5,041 | 2,063 | 39 | 963 | 15 | 11,747 | 176,082 | 7,634 | 115,740 | 319,324 |
| Unplanned | 0 | 3,451 | 0 | 185 | 5,085 | 41,953 | 52,480 | 67,735 | 223 | 171,112 |

Estimate - Planning Department
 Number of Acres Zoned Per District in 2000

§14.1.1: Introduction And Analysis

Table 14-3. Number of Acres Zoned Per District in 2000

| Zoning | Puna | South Hilo | North Hilo | Hama-kua | North Kohala | South Kohala | North Kona | South Kona | Ka'u | Total |
|--------------------------------|---------|------------|------------|----------|--------------|--------------|------------|------------|---------|-----------|
| Single Family | 2,677 | 8,374 | 391 | 631 | 652 | 3,382 | 2,887 | 414 | 781 | 20,189 |
| Multi-Family | 4 | 380 | 0 | 4 | 43 | 1,507 | 1,026 | 0 | 101 | 3,065 |
| Resort | 1 | 136 | 0 | 42 | 14 | 360 | 740 | 15 | 45 | 1,353 |
| Com-mercial | 74 | 1,088 | 10 | 38 | 39 | 426 | 1,015 | 108 | 61 | 2,859 |
| Indus-trial | 490 | 2,185 | 38 | 15 | 59 | 291 | 2,909 | 0 | 52 | 6,039 |
| Indus-trial-Com-mercial Mixed | 23 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 |
| Family Agricul-ture | 22 | 26 | 0 | 0 | 0 | 6 | 39 | 7 | 0 | 100 |
| Resi-dential Agricul-ture | 625 | 185 | 55 | 0 | 22 | 585 | 489 | 144 | 0 | 2,105 |
| Agricul-ture | 198,747 | 73,750 | 61,954 | 165,223 | 67,977 | 119,813 | 167,415 | 112,051 | 252,843 | 1,219,773 |
| Open | 5,029 | 2,065 | 38 | 963 | 27 | 11,951 | 173,821 | 7,628 | 115,740 | 317,262 |
| Project District | 0 | 0 | 0 | 0 | 0 | 0 | 1,748 | 0 | 0 | 1,748 |
| Agricul-tural Project District | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 23 |

Estimate - Planning Department

Lands designated Residential-Agriculture (RA) saw the largest percentage increase in acreage between the years 1989 and 2000 at 60 per cent, although the total acreage of RA zoned lands accounted for less than one-tenth of 1 per cent of the total land area within the County. During the same period, Commercial zoned lands increased by 49 per cent, Multiple Family Residential zoned lands increased by 15 per cent and Industrial zoned lands increased by 14 per cent. Acreages of Open zoned lands fell by 0.6 per cent. Lands designated as Agricultural, excluding lands zoned Unplanned prior to the comprehensive revision to the Zoning Code in 1996, account for 77 per cent of all zoned lands within the County.

§14.1.1: Introduction And Analysis

- Rural Designation

Rural: This category includes existing subdivisions in the State Land Use Agricultural and Rural districts that have a significant residential component. Typical lot sizes vary from 9,000-square feet to two acres. These subdivisions may contain small farms, wooded areas, and open fields as well as residences. Allowable uses within these areas, with appropriate zoning, may include commercial facilities that serve the residential and agricultural uses in the area, and community and public facilities. The Rural designation does not necessarily mean that these areas should be further subdivided to smaller lots. Most lack the infrastructure necessary to allow further subdivision.

- Agriculture Designations

Orchard: Those agricultural lands which though rocky in character and content support productive macadamia nuts, papaya, citrus and other similar agricultural products.

Important Agricultural Land: Important agricultural lands are those with better potential for sustained high agricultural yields because of soil type, climate, topography, or other factors. Important agricultural lands were determined by including the following lands:

- Lands identified as “Intensive Agriculture” on the 1989 General Plan Land Use Pattern Allocation Guide maps.
- Lands identified in the Agricultural Lands of Importance to the State of Hawaii (ALISH) classification system as “Prime” or “Unique”.
- Lands classified by the Land Study Bureau’s Soil Survey Report as Class B “Good” soils. (There are no Class A lands on the island of Hawaii)
- Lands classified as at least “fair” for two or more crops, on an irrigated basis, by the USDA Natural Resource Conservation Service’s study of suitability for various crops.
- In North and South Kona, the “coffee belt”, a continuous band defined by elevation, according to input from area farmers.
- State agricultural parks.

Some areas that meet the criteria for important agricultural lands on an irrigated basis only were included in the “Extensive Agriculture” category due to their remoteness from potential sources of irrigation.

Certain areas that could have been classified as Important Agricultural lands have been placed within urban land use categories. Generally, these are adjacent to existing urban areas. This represents a decision that the orderly development of those urban areas justifies the eventual conversion of those lands to urban use.

Because of the scale of the Land use Pattern Allocation Guide maps used to designate Important Agricultural Land, the location of these lands should be verified by more detailed mapping when considering specific land use decisions.

- Extensive Agriculture: Lands not classified as Important Agricultural Land. Includes lands that are not capable of producing sustained, high agricultural yields without the intensive application of modern farming methods and technologies due to certain physical constraints such as soil composition, slope, machine tillability and climate. Other less intensive agricultural uses such as grazing and pasture may be included in the Extensive Agriculture category.
- Other Designations
 - University: Public university, including ancillary public uses, residential, and support commercial uses.
 - Open: Parks and other recreational areas, historic sites, and open shoreline areas.
 - Conservation Area: Forest and water reserves, natural and scientific preserves, areas in active management for conservation purposes, areas to be kept in a largely natural state, with minimal facilities consistent with open space uses, such as picnic pavilions and comfort stations, and lands within the State Land Use Conservation District.

The urban centers include high, medium and low density designations. These centers and clusters provide physical, social, governmental and economic concentrations so that the total activities of the community can be more readily and easily conducted. In the County, several of these centers have political and social antecedents, while others have been influenced by economic practices. Some of the County's possible future centers may result from the development of resort areas.

The future improvement and development objectives are directed toward making urban and rural centers more efficient, livable, and safe. Growth should be encouraged in terms of renewing older areas or extending existing areas. The creation of new urban and rural centers should be initiated only when it is in the public interest and must be accompanied by commitments from both government and the private sector for the development of basic community and public facilities and services. Infrastructure costs less when new residential areas are located near existing highways, water and sewer lines, and employment centers. Within the rapidly growing districts of South Kohala and North and South Kona, the Land Use Pattern Allocation Guide maps focus future urban development around Waimea and Waikoloa Village, Kawaihae, and between Keahole and Keauhou.

The location of urban and rural uses should be evaluated from the standpoint of how each use services existing and future land uses of the surrounding area. The direction and form of growth in accord with future demand will be influenced by many factors.

The General Plan Land Use Pattern Allocation Guide Map shall also designate areas for urban expansion. An area is designated as urban expansion when the specific settlement pattern and types of uses have yet to be determined.

§14.1.1: Introduction And Analysis

The methodology used to develop the land use pattern reflects estimates of future population based on economic and employment evaluations, existing land uses and zoned areas, determination of community facility needs, and transportation demands for the entire island. The topography and other physical features of each area were also analyzed, and other factors, particularly economic, social, and physical characteristics, were noted.

The following table illustrates the Proposed Land Use Pattern Acreage Allocation by districts. The high, medium, and low density allocations are included within the residential and commercial allocations.

Table 14-4. Land Use Pattern Allocation Guide (LUPAG) Map, Estimated Land Use Allocation Acreage by Judicial District

| LUPAG Map Designations | Puna | South Hilo | North Hilo | Hama-kua | North Kohala | South Kohala | North Kona | South Kona | Ka'u | Total |
|-----------------------------|---------|------------|------------|----------|--------------|--------------|------------|------------|---------|-----------|
| High Density Urban | 0 | 847 | 0 | 0 | 0 | 0 | 458 | 0 | 0 | 1,305 |
| Medium Density Urban | 478 | 1,481 | 69 | 292 | 176 | 1,282 | 1,456 | 292 | 421 | 5,947 |
| Low Density Urban | 8,013 | 10,073 | 617 | 2,293 | 2,668 | 5,084 | 6,287 | 1,070 | 1,148 | 37,253 |
| Industrial | 669 | 4,264 | 29 | 132 | 51 | 1,869 | 3,889 | 0 | 74 | 10,977 |
| Important Agricultural Land | 49,770 | 37,237 | 21,632 | 78,023 | 41,314 | 51,500 | 26,703 | 32,804 | 47,300 | 386,283 |
| Extensive Agriculture | 88,573 | 26,078 | 31,755 | 82,924 | 21,885 | 71,299 | 105,074 | 66,368 | 167,426 | 661,382 |
| Rural | 29,251 | 2,542 | 71 | 0 | 102 | 1,908 | 1,001 | 31 | 13,090 | 47,996 |
| Resort / Resort Node | 0 | 84 | 0 | 0 | 47 | 3,212 | 2,289 | 15 | 29 | 5,676 |
| Open Area | 2,335 | 1,798 | 434 | 1,266 | 2,119 | 14,074 | 6,233 | 2,699 | 4,738 | 35,696 |
| Conservation | 137,210 | 167,779 | 119,710 | 235,212 | 11,217 | 13,957 | 199,585 | 43,395 | 426,956 | 1,355,021 |
| Urban Expansion Area | 3,844 | 122 | 62 | 0 | 258 | 12,264 | 11,995 | 0 | 597 | 29,142 |
| University Use | 0 | 664 | 0 | 0 | 0 | 0 | 461 | 0 | 0 | 1,125 |

Planning Department Estimates – GIS Data

The following is a list of urban and rural centers, industrial areas and resort areas of the County by district.

§14.1.1: Introduction And Analysis

Table 14-5. Urban, Rural, Industrial & Resort Areas by District

| District | Urban and Rural Center | Industrial Areas | Resort Areas |
|-----------|---|--|--|
| Puna | Keaau Pahoa Kurtistown Mt. View Hawaiian Paradise Park Orchidland Estates Volcano | Keaau Keaau-Gateway Center (I-C) Pahoa Panaewa Hawaiian Paradise Park (I-C) | |
| S. Hilo | Hilo Papaikou Pepeekeo-Kulaimano Honomu | Hilo Hilo Iron Works (I-C) Waiakea Houselots (I-C) Papaikou Pepeekeo | Waiakea Peninsula-Reeds Bay (Intermediate) Keaukaha (Minor) Wainaku (Minor) |
| N. Hilo | Laupahoehoe-Papaaloa Ookala | Laupahoehoe-Papaaloa Ookala | |
| Hamakua | Honokaa Paauilo | Haina Honokaa Paauilo | |
| N. Kohala | Hawi Halaula Kapaa Kahua (Kohala Ranch) Niulii | Halaula Hawi | Mahukona (Minor) |
| S. Kohala | Kawaihae Puako Lalamilo Waikoloa Village Waimea | Kawaihae Waikoloa Village Waimea Waikoloa Mauka | Anaehoomalu (Major) Kaunaoa Bay-Hapuna Bay (Major) Pauoa Bay-Honokaope Bay (Major) |
| N. Kona | Keahole to Kailua Kailua-Keauhou Holualoa Mauka Kainaliu-Honalo | Kailua Kona Industrial Subdivision and adjacent area (I-C) Honokohau (I-C) Kainaliu-Honalo Keahole Kaloko | Kailua (Major) Keauhou-Kahaluu (Major) Kaupulehu-Kukio (Major) |
| S. Kona | Captain Cook Kealakekua | Kealakekua-Captain Cook | Keekee-Kalukalu (Retreat) |
| Ka'u | Naalehu Pahala Waiohinu Ocean View | Honuapo Naalehu Pahala Ocean View | Ninole-Punaluu (Minor) |

Note: I-C refers to Industrial-Commercial

Zone of Mix

The concept of "zone of mix" shall be incorporated in the Zoning Code for the purpose of achieving a housing mix as well as to permit the more efficient development of residential lands that have topographic and/or drainage problems. Although the zone of mix allows a mixture of housing types within an area, the density shall not exceed that which is designated for the area. In an area that allows a zone of mix, a certain percentage of the density will be allocated for multiple residential and the remainder will be single-family residential units.

The clustering of housing in the zone of mix concept may be a means of minimizing grading, preserving the natural appearance of topography, and making optimum use of the terrain for residential structures and recreational and open spaces.

Mixed Use Zones

The revision to the Zoning Code, completed in 1996, incorporated the concept of mixed use zones to allow compatible commercial uses to mix with light industrial uses, and the mixing of residential and commercial uses. Mixed use light industrial and commercial zones may include, but are not limited to, wholesale, retail, office uses and personal and business services. Mixed use zones are appropriate in areas of economic transition, such as light industrial areas that are in demand as sites for commercial uses, and older residential areas needed as sites for more intensive development.

Through the careful analysis and examination of past and present situations, the following goals, policies, and standards are set forth to physically plan the lands in the County in the best interest of the island's residents.

14.1.2 Goals

- (a) Designate and allocate land uses in appropriate proportions and mix and in keeping with the social, cultural, and physical environments of the County.
- (b) Protect and encourage the intensive and extensive utilization of the County's important agricultural lands.
- (c) Protect and preserve forest, water, natural and scientific reserves and open areas.

14.1.3 Policies

- (a) Zone urban- types of uses in areas with ease of access to community services and employment centers and with adequate public utilities and facilities.
- (b) Promote and encourage the rehabilitation and use of urban areas that are serviced by basic community facilities and utilities.
- (c) Allocate appropriate requested zoning in accordance with the existing or projected needs of neighborhood, community, region and County.

§14.1.4: Standards

- (d) Conduct a review and re-evaluation of the real property tax structure to assure compatibility with land use goals and policies.
- (e) Incorporate innovations such as the "zone of mix" and "mixed use zones" into the Zoning Code.
- (f) Encourage the development and maintenance of communities meeting the needs of its residents in balance with the physical and social environment.
- (g) Establish a program of continuing review of the Zoning Code in light of emerging new industries and technologies and incorporate revisions to land use regulations as necessary.
- (h) Develop community development or regional plans for all of the districts or combinations of districts in cooperation with community residents and periodically review and amend these documents as necessary or as mandated.
- (i) Ensure that condominium property regimes (CPR) comply with the requirements of the Zoning Code, Subdivision Control Code and other applicable rules and regulations.
- (j) Encourage urban development within existing zoned areas already served by basic infrastructure, or close to such areas, instead of scattered development.

14.1.4 Standards

- (a) The designated land uses will be delineated on the General Plan Land Use Pattern Allocation Guide Map. The broad-brush boundaries indicated are graphic expressions of the General Plan policies, particularly those relating to land uses. They are long-range guides to general location and will be subject to: a) existing zoning; and b) State Land Use District. Similarly, the acreages allocated represent alternatives for the various levels of economic activity and supporting functions, such as resort, residential, commercial and industrial activities. Land required for community and governmental services and programs as well as new towns and resort centers may be accommodated within the allocated acreages.
- (b) Zoning requests shall be reviewed with respect to General Plan designation, district goals, regional plans, State Land Use District, compatibility with adjacent zoned uses, availability of public services and utilities, access, and public need.
- (c) Zoning may be recommended on an incremental basis depending upon construction schedule, development of supporting services and facilities, and other pertinent factors bearing upon the performance of the petitioner.
- (d) The establishment of urban-types of zoning may include additional acreages to account for acreages utilized for public benefit, such as historic sites, public access and parks.

14.2 AGRICULTURE

14.2.1 Introduction and Analysis

In the County, approximately 1,184,599 acres or 46 per cent of the total land area is situated within the State Land Use Agricultural district. Included in the district are lands with a high capacity or potential for agricultural use as well as those with very low potential for productive agricultural activity.

Commercial agriculture in Hawaii County was once dominated by sugar and ranching. With the demise of sugar in the mid-1990s and reduced production volumes within the ranching industry since the mid-1980s, independent farmers producing a wide variety of commodities have played an increasing role in the continued growth of the agriculture industry. At the same time, trends also indicate increasing efficiencies of operations resulting in overall reductions in land requirements.

Large corporations and mid-size and small entrepreneurs have led the way in examining alternative uses for former sugar land. Papaya, macadamia nuts, guava, exotic tropical fruits, forestry and ginger are some of the commodities that have been given a boost by the research and marketing efforts undertaken.

While additional opportunities to develop new commodities may arise, the realization of these opportunities requires the cooperative effort of the large corporations, entrepreneurs, the small independent farmers and government. Large corporations can assist in the supply of land, water, marketing, and capital; the entrepreneurs and small independent farmer can supply the human resources of imagination, determination and hard work; and government can provide an environment that supports their efforts.

In addition to the agricultural land uses relating to the growing of the products, agricultural land uses also include those relating to the packing, processing and manufacturing of the products, that may be more industrial in character, but are nevertheless agricultural. The agricultural industry may also need a variety of such industrial type uses that are dependent upon the specific processing requirements of the product.

In light of the changes faced by commercial agriculture, the land use regulatory system must be examined to determine the adjustments required to allow the agricultural industry to make the change. In agriculturally designated areas, both the State and County have established goals, objectives and policies that reflect a desire to promote agricultural activities as well as preserve and protect agricultural land.

The County and State governments continue to explore possible changes to their respective land use regulatory system in response to the continuous changes occurring within the State's socio-economic climate. As agriculture's contribution to the State's economy since the days of sugar has declined, there has been a concurrent rise by tour-

§14.2.1: Introduction and Analysis

ism as the State's major source of income. The demise of the sugar industry on this island has resulted in thousands of acres of land being removed from productive agricultural use. At the same time, growth in the island's population has contributed towards increasing and costs.

Agricultural land values have risen beyond their value for agricultural purposes. The high cost of agricultural land reflects non-agricultural uses and values rather than the value that may be attributed to land if it were used as a resource for food and fiber production. Although there are many legitimate reasons for allowing zoning and use conversions of agricultural land, the increasing land values is one of the major problems that needs to be addressed to facilitate the expansion of agriculture.

One of the key factors in adjusting to the changing socio-economic conditions is the restructuring of our land use regulatory system to distinguish between important agricultural land and other agricultural land. These distinctions should be made in the evaluative criteria for considering zone changes, permitted uses, minimum lot size requirements, and subdivision development standards.

Rural-style residential-agricultural developments may include either new small-scale rural communities or extensions of existing rural communities. Such development provides opportunities for a mix of residential and small-scale agricultural activities. However, the primary intent of these developments would be to provide an added range to housing opportunities. Along with this housing, the large lots of these rural areas will provide opportunities for part-time agriculture, gardening activities and the raising of livestock on a small scale. By providing opportunities to satisfy the demand for a rural lifestyle on marginal agricultural land, the pressures to develop important agricultural land for these purposes would be decreased.

It should be emphasized that commercial agricultural operations will not be discouraged from or penalized for utilizing lands considered "marginal." Many commodities including macadamia nuts, papaya, anthuriums and orchids are now produced on such lands. To protect these existing agricultural operations from urban encroachment, a buffer area, or uses that are compatible with agricultural operations should be considered before allowing any type of rural or urban development into the area.

Macadamia nuts, cattle, flowers and nursery products, papayas, vegetables and melons and coffee all have the potential for continued growth. Although the prospects for agriculture are encouraging, there are problems that need to be overcome before the potential can be realized. These problems include, but are not necessarily limited to: land cost, cost/availability of water, cost/availability of transportation, cost of labor, marketing, developing and maintaining quality standards, and disease and pest control.

Lands for agricultural parks are areas set aside by the State specifically for agricultural activities to encourage continuation or initiation of such agricultural operations. The

State's Agricultural Parks Program makes land available to small farmers at reasonable cost with long-term tenure. The State Department of Agriculture currently operates four agricultural parks on the island, one each in the districts of Puna, South Hilo, Hamakua and North Kona.

The following goals and policies are intended to address some of the land related problems of agriculture and are to be consistent with and supportive of the overall land use element.

14.2.2 Goals

- (a) Identify, protect and maintain important agriculture lands on the island of Hawaii.
- (b) Preserve the agricultural character of the island.
- (c) Preserve and enhance opportunities for the expansion of Hawaii's Agricultural Industry.

14.2.3 Policies

- (a) Implement new approaches to preserve important agricultural land.
- (b) Assist in the development of basic resources such as water, roads, transportation and distribution facilities for the agricultural industry.
- (c) Assist other State agencies, such as the University of Hawaii, College of Tropical Agriculture and Human Resources, University of Hawaii at Hilo, College of Agriculture, Forestry and Natural Resources Management, Department of Business, Economic Development and Tourism, Office of Planning, Department of Land and Natural Resources and Department of Agriculture, on programs that aid agriculture.
- (d) Agricultural land may be used as one form of open space or as green belt.
- (e) Coordinate and encourage efforts to solve the problems of the agricultural industry in the County of Hawaii.
- (f) In order to minimize the potential conflicts between agricultural and non-agricultural uses, standards and guidelines for the establishment of well defined buffer areas as part of new, non-agricultural developments that are located adjacent to important agricultural lands shall be developed.
- (g) Land zoned for use in the Rural District shall be expanded, where appropriate.
- (h) Develop subdivision standards that make a distinction between agricultural and urban land uses.
- (i) Designate, protect and maintain important agricultural lands from urban encroachment.
- (j) Ensure that development of important agricultural land be primarily for agricultural use.

§14.2.4: Districts

- (k) Support the development of private and State agricultural parks to make agricultural land available for agricultural activities.
- (l) Assist in the development of agriculture.
- (m) Assist in the development of water for agricultural purposes.
- (n) Investigate possibilities to prevent non-agricultural uses that could interfere with potential or existing agricultural activities on important agricultural lands.
- (o) Support efforts to provide tax relief and other incentives to enhance competitive capabilities of commercial farms and ranches, thereby insuring long-term preservation, enhancement, and expansion of viable agricultural lands.
- (p) Ensure that condominium property regimes (CPR) on agricultural-designated lands comply with the requirements of the Zoning Code and other applicable laws, rules and regulations.
- (q) Farm labor housing projects shall be developed in a manner that minimizes the use of important agricultural lands and is consistent with the character of surrounding land uses.
- (r) Encourage, where appropriate, the establishment of visitor-related uses and facilities that directly promote the agriculture industry.
- (s) Important agricultural lands shall not be rezoned to parcels too small to support economically viable farming units.
- (t) Discourage speculative residential development on agricultural lands.
- (u) Encourage other compatible economic uses that complement existing agricultural and pastoral activities.

14.2.4 Districts

The analysis that follows concentrates on agricultural land use and focuses on the relationship of the districts to the County as a whole.

14.2.4.1 PUNA

14.2.4.1.1 Profile

The major agricultural businesses in Puna include macadamia nuts, flowers, foliage, papaya, bananas, tropical fruits and vegetable production. The Puna district is the major papaya growing region in the State. In the past, the papaya industry has been faced with challenges from fruit flies and the Papaya Ringspot Virus. Today, the industry is thriving due to the development of several methods of quarantine treatment and the development of a genetically engineered disease resistant variety. The papaya industry is continuing its efforts to find an acceptable alternative to ethylene dibromide (EDB) fumigation to control fruit flies.

§14.2.4.2: SOUTH HILO

There is a fairly sizable planting of macadamia nuts on the Hilo side of Keaau. Additional plantings may be anticipated as the market dictates. Other future agricultural uses projected include expansion of papaya, bananas, cacao and tree farms, coffee and kava (awa).

Vegetables and a variety of fruits are also grown in the Puna District. Some of the more exotic types of fruits being grown include lychee, rambutan, cherimoya, starfruit, sapodilla, mangosteen, jackfruit, guava, breadfruit and atemoya.

Flowers, chiefly anthuriums and orchids, are grown throughout the district. The major flower cultivation areas are Mt. View, Pahoa, Kapoho and Volcano. Numerous truck farms are located in the Volcano area. Major crops are lettuce, temperate range flowers and cabbage.

The Puna district also has the potential for agricultural processing and manufacturing opportunities utilizing the geothermal resources of the area. These direct use applications of the geothermal resources need to be located within effective proximity of the resource itself and may require the need for new forms of land use management and control.

The State has made lands available for agriculture at the 60-lot Pahoa Agricultural Park, that covers an area of approximately 600 acres. The agricultural park is fully occupied with no lots available for lease.

There are approximately 198,747 acres zoned for agricultural use in Puna.

14.2.4.1.2 Course of Action

(a) Assist in the further development of agriculture.

14.2.4.2 SOUTH HILO

14.2.4.2.1 Profile

Sugar was once the principal crop grown in South Hilo until the closing of Hilo Coast Processing Company in 1984. A diversified agricultural industry has since emerged to make productive use of the former sugar cane lands. The flower, foliage and nursery industry is the leading diversified agriculture industry in the state. The South Hilo district is well-known for the cultivation of flowers and nursery products. Anthuriums, orchids, and landscaping plants are just some of the many types of foliage being grown within the district.

Because of proximity to the marketing area of Hilo, numerous commodities such as vegetables, ginger root and flowers are grown in South Hilo.

§14.2.4.3: NORTH HILO/HAMAKUA

Farms in rural South Hilo are located along major transportation routes. Within the city limits, agricultural uses are found in the Panaewa farm lots, upper Kaumana and Waiakea Uka areas.

There are approximately 73,750 acres of land zoned for agricultural use in South Hilo.

14.2.4.2.2 Courses of Action

- (a) Encourage buffer zones or compatible uses between agricultural and urban/residential areas.
- (b) Support the University of Hawaii at Hilo and Hawaii Community College aid in their development of programs that assist agriculture.

14.2.4.3 NORTH HILO/HAMAKUA

14.2.4.3.1 Profile

Sugar cultivation once dominated the agricultural scene in both districts until the closing of the Hamakua Sugar Company in 1994. The Hamakua Sugar Company once cultivated approximately 35,000 acres in sugar in the North Hilo and Hamakua districts. These vacant sugar lands are slowly being cultivated in various crops. A mainland company has recently initiated plantings of eucalyptus on Kamehameha Schools land along the Hamakua coast in its effort to establish a 15,000-acre eucalyptus plantation. A 1981 study to identify the best potential forest lands within the County identified 80,000 acres, mainly located along the Hamakua coast between the 1,000- and 3,000-foot elevations.

Within both districts there are small truck farms that raise vegetables, fruits, flowers, and macadamia nuts. Taro is also raised within Waipio Valley.

Ranching has now expanded from the upper elevations to the ocean.

There are approximately 227,177 acres zoned for agricultural use in the North Hilo and Hamakua districts.

14.2.4.3.2 Course of Action

- (a) Encourage large landowners to make agricultural lands available for agriculture.

14.2.4.4 NORTH KOHALA

14.2.4.4.1 Profile

Ranching, macadamia nut production, and nursery production are the principal agricultural activities currently operating in North Kohala. Some lands in this district are being converted to large lot rural-residential subdivisions.

§14.2.4.5: SOUTH KOHALA

There are 67,977 acres of agriculturally zoned lands in the district. Over 14,000 acres within this district were previously serviced by agricultural infrastructure. This includes the Kohala Ditch irrigation system, that remains viable and could provide opportunities to more intensively utilize these lands for agricultural purposes.

The agricultural lands of North Kohala also create much of the feeling of open space that is so important to the area. A number of legislative resolutions have supported the protection of viewplanes and open space from the main highway to the sea, most recently Senate Concurrent Resolution No. 146.

14.2.4.4.2 Courses of Action

- (a) Encourage the maintenance and more intensive utilization of the Kohala Ditch irrigation system for agricultural production.
- (b) Support the development of private and State agricultural parks as a means of making agricultural land available for commercial agricultural activities.
- (c) In reviewing Special Permit applications, rezonings, and other land use changes in the Agricultural District, great care should be given to preserve existing viewplanes to and along the coastline.

14.2.4.5 SOUTH KOHALA

14.2.4.5.1 Profile

South Kohala's Waimea region contains the most extensive truck farming area in the County. Vegetables such as celery, daikon (turnip), carrots, lettuce, cabbage, broccoli, tomatoes and bell peppers, and fruits such as strawberries are grown for both local and export markets. Certain flowers and foliage are also grown in this region.

Most of the lands in South Kohala are used for cattle ranching. Parker Ranch is the largest ranch in the area and owns most of the grazing lands.

There are approximately 119,813 acres zoned for agriculture in the district. Although land in the Waimea area is considered some of the most productive in the County, there is a need to develop a more reliable agricultural water system to more fully utilize this potential. With the growth in the district spurred by tourism, urban pressures are increasingly competing for basic resources required by agriculture, namely land, labor, and water.

14.2.4.5.2 Courses of Action

- (a) Protect important agricultural lands from urban encroachment.
- (b) Encourage buffer zones or compatible uses between important agricultural land and adjacent uses of land.

14.2.4.6 NORTH AND SOUTH KONA

14.2.4.6.1 Profile

Coffee, macadamia nut, avocado and ranching are the major agricultural endeavors in Kona. Other commodities grown in Kona include tropical fruits, beans, cucumbers, tomatoes, flowers, foliage and nursery plants.

There are 280,937 acres of land within the State Land Use Agricultural designation in this district. Approximately 279,466 acres are zoned for agricultural uses by the County.

Although the climate of Kona is favorable for agriculture, soils and topography present some limitations, especially for mechanized farming. This has been one of the problems faced by the coffee industry.

Another factor inhibiting agricultural activity in the district is the price of land. There is a substantial disparity between the agricultural use value and market value of land in Kona. In addition, the land ownership pattern in agriculturally suitable areas, is characterized by a few large land holders, and requires favorable lease arrangements that are not always available. The same urbanization pressures faced in the South Kohala district are also present in Kona.

Keahole Agricultural Park, located mauka of Kona International Airport at Keahole, is comprised of 179 acres subdivided into 34 lots. Few lots are available for lease.

14.2.4.6.2 Courses of Action

- (a)** Protect important agricultural lands within the Kona Coffee Belt from urban encroachment through the use of zoning and other mechanisms.
- (b)** Encourage the University of Hawaii at Hilo to accelerate research on agricultural, aquaculture and forestry products that are or could be of economic value to Kona.
- (c)** Encourage buffer zones or compatible uses between important agricultural land and adjacent uses of land.

14.2.4.7 KA'U

14.2.4.7.1 Profile

Macadamia nuts are the major crop grown within the Ka'u District. Sugar, which once dominated the agricultural industry within the district, saw its end with the closing of the Ka'u Sugar Company in 1996.

Other crops, such as bananas, avocados, tomatoes, and carnations are cultivated on a limited scale. Other production includes vegetables, coffee, and hardwoods. Ranch-

ing operations are also found throughout the district. A private initiative has been undertaken to plant approximately 5,000 acres of eucalyptus trees.

There are approximately 252,843 acres of agriculturally zoned land in the district. Over 70 per cent of this total area is not being utilized for agricultural purposes. The lack of an adequate water supply is one of the major limitations to further agricultural development in the district.

14.2.4.7.2 Course of Action

- (a) Encourage and support the expansion of agriculture, including forestry and the macadamia nut industry.

14.3 COMMERCIAL DEVELOPMENT

14.3.1 Introduction and Analysis

Commercial development is basically comprised of businesses in the retail trade and service categories. Commercial areas are generally located in concentrated areas where goods and services may be conveniently sold. Examples are shopping centers, central business districts, and community and neighborhood business areas.

The extent of commercial development is influenced by the number of both resident and transient populations and their incomes, mobility and lifestyles. This land use is also affected by the availability and costs of transportation, internal and external competition, and other factors.

According to the U.S. Census Bureau, the County’s commercial establishments continue to increase in both number of establishments and value of sales. In 1992, there were 1,012 retail and 974 service establishments within the County, an increase of 37 per cent and 87 per cent respectively, over the number of establishments in 1982. Total sales of \$1,700,000,000 were generated by commercial establishments in 1992, an increase of 186 per cent since 1982. Latest figures for 1997 show a 4 per cent decline in the number of retail establishments from 1992 and a 36 per cent increase in the number of service establishments during the same period.

There are two distinct markets for commercial development on the island: the resident and the visitor markets. Adequate planning for commercial establishments in both markets is equally important.

Commercial activity in the County is characterized by the existence of the large urban centers in Hilo and around Kailua-Kona, several smaller centers and many rural neighborhood shopping areas. Hilo and Kailua-Kona serve as the major commercial centers with secondary centers located in Honokaa, Keaau, Waimea, Kealahou, and Naalehu.

§14.3.2: Goals

Recent trends reflect commercial development outside of Hilo's older commercial core and a more decentralized pattern. This decentralization is reflective of the growing markets outside of the immediate environs of Downtown Hilo and the general trend toward multi-centered urban areas. Similarly, commercial development within Kailua-Kona is extending mauka and north of its traditional commercial areas along Alii Drive and Palani Road. Lands mauka of the Queen Kaahumanu Highway have recently been the focus of commercial development with the arrival of Wal Mart, K-Mart, Safeway, Borders Bookstores, Liberty House and other retail operations.

Some of the problems of many of the existing commercial developments are the poor or dilapidated conditions of the older facilities and the inadequacy of vehicular and pedestrian systems. Pedestrian and vehicular circulation patterns are not continuous in all cases making repeated on and off street movements necessary. Such movements serve to congest the streets providing access to these commercial areas and create congestion problems for the entire area. Strip development of commercial facilities has occurred and commercial zoned lands have not always been utilized for their intended purpose.

Following an examination and analysis of present and past situations concerning commercial development, the following goals, policies, and standards have been set forth.

14.3.2 Goals

- (a) Provide for commercial developments that maximize convenience to users.
- (b) Provide commercial developments that complement the overall pattern of transportation and land usage within the island's regions, communities, and neighborhoods.

14.3.3 Policies

- (a) Urban renewal, rehabilitation, and/or redevelopment programs shall be undertaken in cooperation with communities, businesses and governmental agencies.
- (b) Commercial facilities shall be developed in areas adequately served by necessary services, such as water, utilities, sewers, and transportation systems. Should such services not be available, the development of more intensive uses should be in concert with a localized program of public and private capital improvements to meet the expected increased needs.
- (c) Distribution of commercial areas shall meet the demands of neighborhood, community and regional needs.
- (d) Existing strip development shall be converted to more appropriate uses when and where it is feasible.
- (e) Encourage the concentration of commercial uses within and surrounding a central core area.

- (f) The development of commercial facilities should be designed to fit into the locale with minimal intrusion while providing the desired services. Appropriate infrastructure and design concerns shall be incorporated into the review of such developments.
- (g) Applicable ordinances shall be reviewed and amended as necessary to include considerations for urban design, aesthetic quality and the protection of amenities in adjacent areas through landscaping, open space and buffer areas.
- (h) Require developers to provide basic infrastructure necessary for development.
- (i) Encourage commercial areas to develop on an axis perpendicular to the highway.

14.3.4 Standards

There are three basic types of shopping centers:

(a) Neighborhood Centers

- Provide: Convenience goods, e.g., foods, drugs, and personal services.
- Major Shops: Supermarket and/or drug store.
- Number of Shops: 5 to 15.
- Acreage: 5 to 10 acres.
- Approximate Market: 3,000 people.

(b) Community Centers

- Provide: Convenience goods, plus "soft line" items, such as clothing, and "hard line" items, such as hardware and small appliances.
- Major Shops: Variety or junior department store.
- Number of Shops: 20 to 40.
- Acreage: 10 to 30 acres.
- Approximate Market: 15,000 people.

(c) Regional Centers

- Provide: Full range of merchandise and services.
- Major Shops: Full size department store.
- Number of Shops: 40.
- Approximate Market: 50,000 people.

14.3.5 Districts

The following analysis of commercial development by districts is intended to bring into focus the relationship of each district to the County as a whole.

14.3.5.1 PUNA

14.3.5.1.1 Profile

Commercial activity in the Puna district primarily consists of small rural enterprises that serve the surrounding rural-residential and agricultural communities.

Commercial activity is mainly located in the communities of Keaau and Pahoa, with lesser activity in Orchidland Estates, Mountain View, Kurtistown, and Glenwood.

The communities of Keaau and Pahoa are the commercial centers of the district. The extent of commercial development consists of a shopping center in Keaau and grocery and general merchandise stores, service stations, and miscellaneous retail shops and services. The majority of these retail enterprises primarily serve the immediate surrounding communities.

W. H. Shipman, Ltd. is currently seeking to rezone approximately 32 acres of land in Keaau from an Agricultural to an Industrial-Commercial Mixed Use district. The project site is located adjacent to the Shipman Business Park and mauka of the Volcano Highway-Keaau Bypass intersection. W.H. Shipman plans to initially develop a shopping center with up to 118,000 square feet of retail floor area on approximately 16 acres located within the northern half of the 32-acre project area. The balance of the project area is proposed to be developed as a mixed use commercial/light industrial area with approximately 100,000 to 125,000 square feet of floor area. Completion of this project is anticipated in 2008.

Population is scattered throughout the district and the remainder of the commercial activity is minimal. Proximity to Hilo limits the demand for commercial activities as Hilo is, to a great extent, the major shopping area for the residents of Puna.

14.3.5.1.2 Courses of Action

- (a) Centralization of commercial activities in Pahoa Town, rather than along the Pahoa By-Pass, to serve the residents of Lower Puna shall be encouraged.
- (b) Expanded commercial services to meet the needs of population growth in the Puna district shall be encouraged in Keaau.
- (c) Rehabilitation of existing commercial development in appropriate locations shall be encouraged.
- (d) Appropriately zoned lands shall be allocated as the need arises.
- (e) Allow the establishment of small neighborhood commercial areas within existing non-conforming, residential-agricultural (rural) subdivisions.

14.3.5.2 SOUTH HILO

14.3.5.2.1 Profile

One of the island's two major commercial centers is located in South Hilo. Hilo contains a downtown business district, several shopping center complexes, and neighborhood commercial facilities. The rural communities, primarily plantation settlements located along the coastal areas have limited commercial facilities.

Commercial activity in Hilo is undergoing rapid change. Most of the recent commercial development serving the East Hawaii region has been concentrated in the Waiakea District and includes the Prince Kuhio Plaza and Waiakea Shopping Center complexes. Other shopping areas include the Hilo Shopping Center, the Kaiko'o Mall and surrounding office developments, and the Downtown Hilo central business district. Downtown Hilo generally lacks adequate parking facilities and efficient traffic circulation. The physical condition of many buildings within Downtown Hilo is also poor, although there have been recent efforts to rehabilitate many of the buildings in the area. Some of these efforts include the rehabilitation of the Palace Theater, Kress Building, S. Hata Building and the Toyama Building. Another effort to revitalize Downtown Hilo is seen in the establishment of the Kalakaua Park Heritage Corridor, that is part of the larger Hawaiian Heritage Corridor Program that seeks to preserve historic sites and buildings along transportation corridors. As detailed within the Downtown Hilo Redevelopment Plan, development of the Kalakaua Park Heritage Area would preserve and rehabilitate public and private structures of historical or architectural significance, reinforce the area's past and future function and image as an important civic area, and serve as an activity center for attracting both residents and tourists. Without continuing efforts for renewal, rehabilitation, and/or redevelopment, the downtown business district may further lose its competitive position.

In addition, neighborhood shopping areas are located throughout the city. The largest of these are supermarket-variety store complexes in the Waiakea Homesteads area. These neighborhood shopping complexes, including KTA Super Stores and Sack-n-Save supermarkets, are located near one of the busiest intersections in the city and is part of the High Density Urban core of Hilo.

Multiple ownership of contiguous properties has created problems which make orderly development in any one area difficult. Incompatible land uses also create an undesirable climate for commercial development.

Expansion of the University of Hawaii facilities and community will induce a need for commercial services in proximity to the campus. Under the University land use category, support commercial uses are permitted.

§14.3.5.3: NORTH HILO

14.3.5.2.2 Courses of Action

- (a) Continue to pursue the rehabilitation, renewal, and redevelopment of downtown Hilo. Continual improvement of other existing commercial areas must also be assured.
- (b) Assistance to small businesses in obtaining loans and management education classes and manpower training programs shall be encouraged.
- (c) Controls that discourage speculation shall be established.
- (d) Appropriately located commercial zoned lands shall be allocated as the need arises.
- (e) Commercial zoned lands in proximity to the University of Hawaii at Hilo shall be allocated as the need arises.
- (f) Within the Waiakea Houselots "medium density" area, commercial development shall be focused on the major streets---Kekuanaoa, Piilani, Manono, and Lanikaula, while the interior blocks should be zoned primarily for single- and multi-family residential use.

14.3.5.3 NORTH HILO

14.3.5.3.1 Profile

Commercial development is limited in the North Hilo district. There are several small rural communities in the district that are primarily plantation settlements. Miscellaneous stores and services are found in Ninole, Papaaloa, Laupahoehoe, and Ookala. The majority of the commercial services are located in Laupahoehoe.

As the facilities in North Hilo provide limited services, Hilo serves as the major shopping area for the residents of the district.

Population in the district has been declining over the past thirty years, thus limiting the market for expansion of existing commercial facilities.

14.3.5.3.2 Courses of Action

- (a) Centralization of commercial activities in the Laupahoehoe-Papaaloa area shall be encouraged.
- (b) Appropriately zoned lands shall be allocated as the need arises.
- (c) Do not allow strip or spot commercial development on the highway outside of the primary commercial area.

14.3.5.4 HAMAKUA

14.3.5.4.1 Profile

The town of Honokaa provides commercial and government services for the Hamakua district. Honokaa was once the second largest community on the island for several decades and has a high school, government offices, and numerous stores and services.

§14.3.5.5: NORTH KOHALA

The smaller communities of Kukuihaele and Paauilo have limited commercial facilities.

Although some renovations and new commercial buildings have occurred in Honoka'a, many of the structures housing commercial activities are generally still in poor or dilapidated condition and lack adequate parking facilities.

14.3.5.4.2 Courses of Action

- (a) Centralization of commercial activities in the Honokaa area shall be encouraged. Urban renewal of the area should be undertaken.
- (b) Suitable commercially zoned lands shall be provided as the need arises.
- (c) Encourage commercial activities within Honokaa town to promote and enhance the history and culture of the paniolo and former sugar plantation.

14.3.5.5 NORTH KOHALA

14.3.5.5.1 Profile

Commercial activity in the North Kohala district is located to a limited degree in the village of Halaula with Kapaau and Hawi serving as the main commercial centers. The village of Waimea in the South Kohala district also serves the commercial needs of the residents of this district.

14.3.5.5.2 Courses of Action

- (a) The development of a commercial core within the towns of Hawi or Kapaau shall be encouraged.
- (b) Continual improvement of commercial facilities shall be undertaken.
- (c) Develop and encourage the use of special design districts in Hawi and Kapaau that include guidelines to preserve, protect and enhance the rural and historic qualities of the commercial areas.
- (d) Do not allow strip or spot commercial development on the highway outside of the designated urban areas.

14.3.5.6 SOUTH KOHALA

14.3.5.6.1 Profile

Commercial activity in the South Kohala district is centered in the Waimea, and Kawaihae, and Waikoloa Village areas. The Kawaihae area contains a few miscellaneous commercial facilities surrounding the Kawaihae port.

The Waimea area contains a number of commercial facilities and professional services. The major facility is the Waimea Shopping Center. This shopping complex in-

§14.3.5.7: NORTH KONA

cludes a supermarket, various retail stores, restaurants, a bank, and other services. Parker Ranch Shopping Center, once the major shopping complex in the district, is currently undergoing renovation as part of a larger plan by the Richard Smart Foundation Trust to expand the commercial area of Waimea. In 1992, commercial lands within Waimea Town were increased by approximately 104 acres as part of the implementation of the Richard Smart Foundation Trust's Parker 2020 Master Plan that detailed the future growth of residential, commercial and industrial development in Waimea over the course of 35 years.

Transportation facilities within the district include Kawaihae Harbor, Waimea-Kohala airport, and major highway systems. These transportation facilities provides a vital link between the growing resort areas along the coast, the transport of goods from Kawaihae Harbor and the commercial area within Waimea.

The visitor industry is the major economic force in the district. The Mauna Kea, Mauna Lani and Waikoloa Beach Resorts, located in the coastal region, have established the South Kohala District as one of the world's premiere resort destinations. These complexes contain their own ancillary commercial areas. The King's Shops, located on 9.5 acres within the Waikoloa Beach Resort, currently hosts 40 tenants offering a range of specialty retail shops, restaurants and services to both visitors and local residents.

14.3.5.6.2 Courses of Action

- (a) The establishment of Waimea as a regional commercial center for northern Hawaii shall be encouraged.
- (b) Establish controls to insure orderly development and minimize speculation of commercially zoned lands.
- (c) Continue the concentration of commercial uses in Waimea, Kawaihae, Waikoloa Village, and in the resort areas. Do not allow strip or spot commercial development on highways outside of these primary commercial areas.

14.3.5.7 NORTH KONA

14.3.5.7.1 Profile

Commercial activity in the North Kona district is located in Kailua-Kona, in the Keauhou Resort area, and in several mauka rural communities along the Mamalahoa Highway.

Increased commercial activity in Kailua has paralleled the growth of the tourist industry in the area and resident population growth. Commercial facilities, consisting of office and shopping complexes, professional and financial service buildings, retail shops, and restaurants, are located on Alii Drive and Kuakini Highway, mainly between Palani and Hualalai Roads. Kailua-Kona provides services for both residents as

§14.3.5.8: SOUTH KONA

well as visitors. Vehicular and pedestrian systems within Kailua village are poor and there is a lack of adequate parking facilities. The increase in commercial development within Kailua-Kona has extended beyond its traditional commercial area on the makai side of Queen Kaahumanu Highway and along Palani Road. Major retailers including Wal-Mart, K-Mart, Safeway and Borders Bookstore have begun to occupy lands on the mauka side of Queen Kaahumanu Highway, expanding the commercial core of Kailua-Kona. Approximately 315 acres located on the mauka side of Queen Kaahumanu Highway and situated north of Palani Road was zoned for Commercial uses in the mid 1990s. This area, known as Makalapua Center, is currently home to K-Mart and Liberty House and a new 10-plex movie theater currently under construction.

The Keauhou Shopping Center is located at the south end of Ali'i Drive along Kamehameha III Road and provides both residents and visitors with range of retail establishments and services such as a supermarket, drug store, restaurants and real estate offices.

14.3.5.7.2 Courses of Action

- (a) Controls to prevent speculative practices on commercially zoned lands may be established.
- (b) Implementation of programs to correct existing deficiencies shall be undertaken.
- (c) Appropriately zoned lands shall be provided as the need arises.

14.3.5.8 SOUTH KONA**14.3.5.8.1 Profile**

Commercial activity in the South Kona district is located in several village areas along the Mamalahoa Highway in the mauka area and are geared primarily towards the needs of residents.

Population is distributed along the Mamalahoa Highway or dispersed on the slopes in agricultural or rural-residential communities.

Due to the sloping terrain and many non-conforming commercial uses, commercial strip development has occurred along the Mamalahoa Highway, though the commercial activity is focused in the Kealakekua-Captain Cook area. Commercial services in the area include financial and professional services, a supermarket, specialty shops and stores, hotel and restaurants and service stations.

14.3.5.8.2 Courses of Action

- (a) Centralize commercial activities in existing town centers.
- (b) Appropriately zoned lands shall be provided as the need arises.

§14.3.5.9: KA'U

- (c) Allow the development of small-scale visitor-oriented commercial facilities along Ke Ala O Keawe Road (City of Refuge Road) leading to Pu'uhonua O Honaunau National Historic Park.

14.3.5.9 KA'U

14.3.5.9.1 Profile

Commercial activities in the Ka'u district are concentrated in the communities of Pahala, Naalehu, and Waiohinu and the area of the Hawaii Volcanoes National Park.

Pahala was built around a former sugar mill, once the major employer of the area, and contains a high school and hospital that serve the district. Commercial facilities, consisting mainly of convenience goods and services, are located in this community.

Naalehu contains a greater variety of commercial facilities. Government facilities in the community include educational facilities for elementary and intermediate students and a police facility serving the district. Commercial development includes a small shopping center complex.

Waiohinu lies a few miles southwest of Naalehu. The major commercial facility here is a 14-unit hotel with a few small commercial establishments within the community.

There are various commercial establishments, including general stores, restaurants, service station, laundromat and offices in Ocean View along both sides of Highway 19.

The Hawaii Volcanoes National Park in the Ka'u district contains commercial facilities connected with the Volcano House hotel complex and the Kilauea Military Camp.

14.3.5.9.2 Courses of Action

- (a) Centralization of commercial activity in the communities of Pahala, Naalehu and Ocean View and the area of the Volcanoes National Park shall be encouraged.
- (b) Do not allow strip or spot commercial development on the highway outside of the designated urban areas.

14.4 INDUSTRIAL

14.4.1 Introduction and Analysis

Industrial development includes manufacturing and processing, wholesaling, large storage and transportation facilities, power plants, and government baseyards.

There are two distinct types of industrial development. One sector is service-oriented and is affected by population and the level of activity of other business activities. The

other sector, basic industries, is mostly influenced by outside markets. The location of industrial developments is important for many reasons. In the case of service types of industrial development (non-basic), areas designated for industrial uses must be close enough to population and/or commercial areas for efficiencies but still distant enough to avoid traffic problems. Some industrial districts consist of enterprises and facilities that are not necessarily compatible with commercial areas. Businesses included in this district are generally more noxious than those in general commercial areas. Industrial developments in many communities are located adjacent to these areas and could result in environmental problems such as noise, air and water pollution.

Basic industrial activity is usually found close to raw products or other key resources. Both kinds of industries are affected by the availability of transportation facilities. Other factors equally important are the availability of public utilities, the cost of land, and internal and external circulation.

A portion of the County's industrial activity is related to agriculture. These agricultural industrial activities include the processing of coffee, macadamia nuts, meat products, tropical fruits, vegetables, and timber. The processing of these export products is expected to expand.

Recently, there have been new endeavors in alternate energy and aquaculture activities at Keahole in the North Kona district and geothermal- related development in the district of Puna. Both of these developments are utilizing resources not previously tapped creating the possible need for new forms of land use management and control.

Service-oriented industries, such as wholesaling, government facilities, printing, and bakeries, are located close to population centers. The majority of such facilities are located within the South Hilo district. North Kona, with its growing population, has also seen the number of its service industries increase quite rapidly.

There are approximately 6,000 acres of industrially zoned lands in the County. Many of these Industrial-zoned lands are used for manufacturing, manufacturing services, and wholesaling. There are other lands zoned for agricultural, commercial, and other uses that are used for industrial purposes. The existence of non-conforming uses which are incompatible with industry creates an undesirable land use pattern. In fact, the physical appearance of many of the island's industrial areas needs improvement.

There are three industrial zoning districts within the Zoning Code: General Industrial (MG); Limited Industrial (ML); and Industrial – Commercial Mixed District (MCX). The MG district applies to areas for uses that are generally considered to be offensive and noxious. These noxious heavy industrial uses must be separated from residential and other incompatible uses in the zoning process. The ML district applies to areas for business and industrial uses that are generally in support of, but not necessarily compatible with those permissible activities and uses in other commercial districts.

§14.4.2: Goals

The MCX district allows a mix of some industrial uses with commercial uses. The following areas are identified for industrial – commercial mixed uses: Keaau (Gateway Center); Hawaiian Paradise Park; Hilo Iron Works; Waiakea Houselots; Kona Industrial Subdivision and the adjacent area to the north; and Honokohau (south of the existing Kaloko Industrial Subdivision).

The following goals, policies and standards are set forth to guide the development of industrial areas in the best interest of the County and its residents. The residents must be made aware of the circumstances resulting from industrial development. Citizen participation, awareness, and most of all, citizen understanding are vital in the development of industrial areas, as in all phases of the planning process.

14.4.2 Goals

- (a) Designate and allocate industrial areas in appropriate proportions and in keeping with the social, cultural, and physical environments of the County.
- (b) Promote and encourage the rehabilitation of industrial areas that are serviced by basic community facilities and utilities.

14.4.3 Policies

- (a) Support the creation of industrial parks in appropriate locations as an alternative to strip development.
- (b) Achieve a broader diversification of local industries by providing opportunities for new industries and strengthening existing industries.
- (c) Locate industrial areas convenient to transportation facilities, and provide a variety of industrial zoned districts and lot sizes, depending on the needs of the industries and the communities.
- (d) Improve the aesthetic quality of industrial sites and protect amenities of adjacent areas by requiring landscaping, open spaces, buffer zones, and design guidelines.
- (e) Industrial development shall be located in areas adequately served by transportation, utilities, and other essential infrastructure.
- (f) Provide flexibility within the Zoning Code to accommodate emerging new industries.
- (g) Industrial-commercial mixed use districts shall be provided in appropriate locations.
- (h) Require developers to provide basic infrastructure necessary for development.

14.4.4 Standards

- (a) Industrial development shall maintain or improve the quality of the present environment.

- (b) Industrial activities may be located close to raw materials or key resources.
- (c) Topography of industrial land shall be reasonably level.
- (d) Industrial development shall be conveniently located to its labor resource.
- (e) Buffer zones shall be established between industrial and adjacent incompatible uses of land.
- (f) The direction of wind patterns and the absence of tradewinds shall be considered in the siting of industrial areas.

14.4.5 Districts

The following is an analysis by district with reference to industrial development. The brief analysis of each district is intended to bring into focus the relationship of the district to the County as a whole.

14.4.5.1 PUNA

14.4.5.1.1 Profile

There are approximately 490 acres of industrial zoned lands in the Puna District.

The 488-acre W.H. Shipman Industrial Park is located near the Puna-South Hilo District boundary. It is being developed as another major industrial center for East Hawaii. Industrial uses in the area range from warehousing to construction yards. W.H. Shipman Ltd. also has plans for additional mixed use industrial-commercial zoned lands in close proximity to the industrial park.

The Puna District includes various agricultural industrial activities including the Mauna Loa Macadamia Nut Corporation's processing facility, flower packaging, and papaya processing and packaging. Other industrial activities in the area include cinder and rock quarrying and certain cottage industries.

The Puna Geothermal Venture power plant began operation in 1993. It currently produces 30 megawatts of energy from the use of geothermal steam.

The Puna geothermal resource subzone is identified on the General Plan Land Use Pattern Allocation Guide map. Activities associated by the use of the geothermal by-products may be established within and/or in close proximity to the geothermal resource subzone.

14.4.5.1.2 Courses of Action

- (a) Identify sites suitable for future industrial activities as the need arises.
- (b) Industrial-commercial mixed use districts may be provided in appropriate locations.

§14.4.5.2: SOUTH HILO

- (c) Service oriented Limited Industrial and/or Industrial-Commercial uses may be permitted in Pahoa although the area is not currently identified in the LUPAG map.

14.4.5.2 SOUTH HILO

14.4.5.2.1 Profile

The South Hilo district has approximately 2,185 acres of industrial zoned lands. With almost 36 per cent of the island's Industrial-zoned lands, South Hilo is the major industrial center on the island. The principal industrial areas are the Kanoiehua area, Hilo Harbor, and the Hilo International Airport area.

Industrial development in Hilo is primarily due to its available transportation facilities, the harbor and airport, and its concentration of population.

There are also industries involved with the processing and packaging of locally grown products. Papaya grown in Puna is inspected, fumigated, and packaged in Hilo. Major processors of livestock products are located in South Hilo.

Other industrial activities include quarrying, garment manufacturing, storage, wholesaling facilities and numerous other population service-oriented activities.

Besides transportation facilities, major advantages of Hilo include the availability of labor, a full range of community facilities and the availability of utilities and land. Industrial activities in both service and non-service categories are expected to expand in Hilo.

14.4.5.2.2 Courses of Action

- (a) Encourage the centralization of industrial activities in the Kanoiehua Industrial area. Noxious industries shall be located away from residential and related areas.
- (b) Identify sites suitable for future industrial activities as the need arises.
- (c) Encourage the State and the Department of Hawaiian Home Lands to develop industrial zoned lands in the Kanoiehua Industrial area and airport industrial area.
- (d) Allocate appropriately zoned lands.
- (e) Industrial-commercial mixed use districts may be provided at appropriate locations.

14.4.5.3 NORTH HILO

14.4.5.3.1 Profile

There are approximately 38 acres of industrial zoned lands within the North Hilo district. These industrial zoned lands were primarily used by the former sugar companies for the processing of sugar.

Limited industrial facilities such as warehousing are located in Laupahoehoe.

14.4.5.3.2 Courses of Action

- (a) Identify sites suitable for future industrial activities as the need arises.
- (b) Service oriented Limited Industrial and/or Industrial-Commercial uses may be permitted in the Laupahoehoe-Papaaloa area although the area is not currently identified on the LUPAG map.

14.4.5.4 HAMAKUA

14.4.5.4.1 Profile

There are approximately 15 acres of industrial lands within the Hamakua district. These industrial zoned lands were primarily used by the former sugar companies for the processing of sugar. The macadamia nut industry utilized some of these industrial zoned lands in the later years. The recent completion of a 60 megawatt co-generation power plant at Haina will encourage other manufacturing activities by providing thermal energy (waste heat) that could be utilized for drying of macadamia nuts or aquaculture activities.

There are some industrial developments in Hamakua, most of which are small family-operated operations. These industries include dairy operation, miscellaneous food processing, sawmills wood carving, and other service-oriented endeavors. The bulk of industrial activity is in the Honokaa-Haina area.

In terms of level topography, there is a limited amount of suitable lands for industrial use. The Zoning Code allows agriculture-related industrial facilities to be built in agricultural zoned districts. Further, Special Permits may also be secured within the State Land Use Agricultural District.

14.4.5.4.2 Courses of Action

- (a) Identify sites suitable for future industrial activity as the need arises.
- (b) Encourage the rehabilitation of existing service-oriented industrial areas.

14.4.5.5 NORTH KOHALA

14.4.5.5.1 Profile

Industrial activity in North Kohala consists of small agriculturally related services. There are approximately 59 acres of industrial zoned lands within the district.

14.4.5.5.2 Courses of Action

- (a) Identify sites suitable for future industrial activity as the need arises.
- (b) Service oriented Limited Industrial and/or Industrial-Commercial uses may be permitted in the Hawi area although the area is not currently identified on the LUPAG map.

14.4.5.6 SOUTH KOHALA

14.4.5.6.1 Profile

There are 291 acres of industrial zoned lands within the South Kohala district.

There are two areas where most of the industrial activity in South Kohala takes place: Waimea and Kawaihae Harbor. Many of the industrial activities in Waimea are linked with agriculture and include a vacuum cooling plant, the preserving of vegetables, warehousing, and dairy operation. These industrial activities, however, are scattered throughout the Waimea area.

The Kawaihae Harbor is a port facility for West Hawaii. Industrial use of the area consists of storage facilities.

Several service-oriented industrial activities are located in this district. Among these activities are government baseyards, utility installations and development of specialized equipment for the astronomy facilities. Several quarrying operations were established within the district. The West Hawaii Concrete quarry and processing facility is located in mauka Waikoloa. The General Plan Land Use Pattern Allocation Guide map designates this facility and lands in the immediate area for industrial and its related uses.

14.4.5.6.2 Courses of Action

- (a) Encourage the development of a regional industrial park at Kawaihae and centralize limited industrial activities in Waimea.
- (b) Industrial development should be in harmony with surrounding uses and the environment.
- (c) Identify sites suitable for future industrial activities as the need arises.

14.4.5.7 NORTH KONA

14.4.5.7.1 Profile

There are 2,909 acres of industrial zoned lands in the North Kona district.

Most of Kona's industrial development is service oriented and located in the northern portion of the North Kona district from Kailua to the Kona International Airport at Keahole. The Kona Industrial Subdivision in Kailua-Kona has transformed into a mixed use industrial-commercial area over the years. Newer industrial areas, including the Kaloko Industrial subdivision, are being developed to the north of Kailua-Kona. The industrial activities within these newer areas include warehousing, lumber storage yards, auto body shops, wholesaling and other service oriented activities.

The energy and aquaculture activities at the Natural Energy Laboratory of Hawaii at Keahole have become major employment generators in the district. Though located in industrial zoned districts, these alternate energy and aquaculture activities are not the traditional uses usually found in industrial areas.

Major factors to be considered for the existing industrial areas and other new developments are their visual effects on motorists and passengers using Queen Kaahumanu Highway and the views from the residential areas above.

14.4.5.7.2 Courses of Action

- (a) Identify sites suitable for future industrial activities.
- (b) Additional industrial acreage should be provided at the Kona International Airport at Keahole for support facilities for the airport.
- (c) Industrial development should be in harmony with surrounding uses and the environment.
- (d) Industrial-commercial mixed use districts may be provided in appropriate locations.
- (e) Service oriented Limited Industrial and/or Industrial-Commercial uses may be permitted in the Kainaliu-Honalo area although the area is not currently identified on the LUPAG map.

14.4.5.8 SOUTH KONA

14.4.5.8.1 Profile

There are no Industrial zoned lands in the South Kona district.

The major industrial export activity is coffee and macadamia nut milling and roasting. Other activities include slaughterhouses, fish packing and processing and ancillary ag-

§14.4.5.9: KA'U

ricultural services. Many of these industrial activities are located on Agricultural-zoned lands and approved through the issuance of Special Permits.

Other service related industrial uses such as warehousing, garages and auto body shops are located in pockets along the Mamalahoa Highway. Because of its topographic condition, however, level land necessary for development is limited in the mauka areas.

14.4.5.8.2 Courses of Action

- (a) Identify sites suitable for future industrial activities as the need arises.
- (b) Service oriented Limited Industrial and/or Industrial Commercial uses may be permitted in the Kealakekua-Captain Cook area although the area is not currently identified on the LUPAG map.

14.4.5.9 KA'U

14.4.5.9.1 Profile

There are approximately 52 acres of industrial zoned lands in the Ka'u district.

Aside from the macadamia nut industry, there are no other dominant industrial activity within the Ka'u district. There are miscellaneous activities, such as County and State baseyards, public utilities stations, and fish processing. The distance from port facilities in Hilo creates somewhat of a problem for the movement of goods to and from this district. Approximately 13 acres of Industrial zoned lands that accommodate a gas utility, telecommunications, auto repair and soil remediation facilities are located in Naalehu.

C. Brewer and Co., Ltd. is considering development plans for the former Pahala Sugar Mill site. Preliminary plans identify the former mill site as the industrial service center of Pahala, providing agricultural processing and light industrial uses. Uses being contemplated include wood milling, lumber storage, research facilities, food processing, and other limited industrial uses. These plans would require the increase of Industrial-zoned lands surrounding the former Pahala Mill site from its current 33.6 acres to 81.5 acres.

14.4.5.9.2 Courses of Action

- (a) Identify sites suitable for future industrial activities as the need arises.
- (b) Service oriented Limited Industrial and/or Industrial-Commercial uses may be permitted in the Naalehu area although the area is not currently identified on the LUPAG map.

14.5 MULTIPLE RESIDENTIAL

14.5.1 Introduction and Analysis

The multiple residential district is part of the County's overall land use structure and provides for residential structures containing two or more dwelling units.

Multiple residential living is becoming a way of life for many people. This type of housing is preferred by those who prefer not to own a single-family residence, who find it financially difficult to own a single-family residence, and those with changing employment, among other reasons. In practice, multiple residential developments use less land area per person, and locate in areas of concentrated economic and population activity where land is scarce and costly. This trend will continue in the future due to rapid urban growth, mobile populations and the rising costs of land and improvements.

In response to the increase in demand for multiple residential housing, numerous structures have been constructed, are being constructed, or are in the planning stages. However, as the market responds to this increased demand with the construction of multiple residence structures, land use planning and development standards will be essential in assuring that any development will comply with County ordinances, goals, policies, and standards.

Throughout the County, there are 3,065 acres of land zoned for multiple residential use. However, some these lands are also used for other purposes, such as single family dwellings.

Some of the problems associated with multiple residential developments include the increased volume of traffic that the higher density use generates; the incompatible uses in surrounding areas; the lack of infrastructure, namely sewers, water and adequate access; the existence of non-conforming uses within zoned areas; the lack of development in appropriately zoned areas; and the increasing costs of land and construction.

The resort areas are typically designed with large proportions of multiple family residential units sold as occasional visitor units. In Hawaii County, this pattern has manifested itself especially in the North Kona and South Kohala resort areas. These units are generally higher priced in comparison to the residentially oriented developments outside the vicinity of the resort plan.

The following goals, policies, and standards are the result of the examination and analysis of past and present situations.

14.5.2 Goals

- (a) To provide for multiple residential developments that maximize convenience for its occupants.
- (b) To provide for suitable living environments that accommodate the physical, social and economic needs of the island residents.
- (c) To enhance the overall quality of life in our residential communities.

14.5.3 Policies

- (a) Appropriately zoned lands shall be allocated as the demand for multiple residential dwellings increases. These areas shall be allocated with respect to places of employment, shopping facilities, educational, recreational and cultural facilities, and public facilities and utilities.
- (b) Incorporate reasonable flexibility in applicable codes and ordinances to achieve a diversity of socio-economic housing mix.
- (c) Encourage flexibility in the design of residential sites, buildings and related facilities to achieve a diversity of socio-economic housing mix and innovative means of meeting the market requirements.
- (d) The rehabilitation and/or utilization of multiple residential areas shall be encouraged.
- (e) To assure the use of multiple residential zoned areas and to curb speculation and resale of undeveloped lots only, the County may impose incremental and conditional zoning, which shall be based on performance requirements.
- (f) Applicable codes and ordinances shall be reviewed and amended as necessary to include consideration for urban design, and aesthetic quality through landscaping, open space, and buffer areas.
- (g) Support the rezoning of those multiple residentially zoned lands that are used for other purposes to a more appropriate zoning designation.
- (h) Require developers to provide basic infrastructure necessary for development.

14.5.4 Standards

- (a) Areas shall be located in such a manner that traffic generated by high density development will not be required to travel through areas of lesser density en route to principal community facilities.
- (b) Areas shall be protected from incompatible uses by transition zones.
- (c) Provide adequate access to arterial streets, shopping facilities, schools, employment centers, and other services.
- (d) Development shall not be permitted in natural hazard areas unless proper on-site improvements are provided.

- (e) Development shall be located in areas where public utilities can be economically provided at a level adequate to meet the demand for the concentrated service.
- (f) Recreational area and/or facilities shall be considered in multiple residential development.

14.5.5 Districts

The following is an analysis by district of multiple residential development. It is intended to bring into focus the relationship of the district to the County as a whole.

14.5.5.1 PUNA

14.5.5.1.1 Profile

The Puna district has approximately four acres zoned for multiple residential use. The predominant form of housing in the district is single family development. However, due to the forecasted population growth, the demand for multiple residential development may increase.

14.5.5.1.2 Course of Action

- (a) Appropriately zoned lands shall be allocated as the need for multiple residential development increases.

14.5.5.2 SOUTH HILO

14.5.5.2.1 Profile

Throughout the district, there are 380 acres zoned for multiple residential use.

In addition to the areas specifically zoned for multiple residential use, areas zoned for resort and commercial zones also allow multiple residential development.

Many of the zoned areas lack the basic infrastructure to support the higher density use. Examples of this include the absence of a sewer system in the apartment zoned area below the University of Hawaii at Hilo and the inadequate roadway system within the Puueo and Kapiolani-Ululani Streets area.

14.5.5.2.2 Courses of Action

- (a) Re-evaluation of existing zoned areas and re-allocation of lands in appropriate locations shall be undertaken.
- (b) Appropriately zoned lands shall be allocated as the need for multiple residential development increases.

14.5.5.3 NORTH HILO

14.5.5.3.1 Profile

The North Hilo district has no area zoned for multiple residential use although existing commercial zoned areas permit the higher density residential use.

14.5.5.3.2 Course of Action

- (a) Appropriately zoned lands shall be allocated should the need arise.

14.5.5.4 HAMAKUA

14.5.5.4.1 Profile

The Hamakua District has approximately four acres zoned for multiple residential development.

14.5.5.4.2 Course of Action

- (a) Appropriately zoned lands shall be allocated as the need for multiple residential development increases.

14.5.5.5 NORTH KOHALA

14.5.5.5.1 Profile

The North Kohala district has approximately 43 acres zoned for multiple residential development. With people living in this district but working in the South Kohala resort area, there may be some activity in multiple residential development.

14.5.5.5.2 Course of Action

- (a) Appropriately zoned lands shall be allocated as the need for multiple residential development increases.

14.5.5.6 SOUTH KOHALA

14.5.5.6.1 Profile

The South Kohala district has about 1,507 acres of multi-residential land with the vast majority located in the resort areas.

Although activity in the construction of these types of units is currently limited, the district is projected to increase in population and visitor activity that will generate an increased demand for multiple residential development. The revised Parker Ranch 2020 project proposes the rezoning of 37.66 acres to multiple family residential.

14.5.5.6.2 Courses of Action

- (a) Basic infrastructure shall be provided to those areas zoned for higher density use.
- (b) Appropriately zoned lands shall be allocated as the need arises.

14.5.5.7 NORTH AND SOUTH KONA

14.5.5.7.1 Profile

The Kona district has approximately 1,026 acres zoned for multiple residential use in addition to commercial zoned areas that permit higher density residential development.

Some of the areas zoned for high density residential use lack the basic infrastructure such as sewer, water and adequate roadway systems that limit development for the intended use.

14.5.5.7.2 Courses of Action

- (a) Re-evaluation of existing zoned areas and re-allocation of lands in appropriate locations shall be undertaken.
- (b) Appropriately zoned lands shall be allocated as the need for multiple residential development increases.

14.5.5.8 KA'U

14.5.5.8.1 Profile

There are 101 acres zoned for multiple residential use within the district. This zoned acreage is located in Pahala and at Punalu'u.

The Ka'u district is expected to experience further activity in multiple residential construction.

14.5.5.8.2 Course of Action

- (a) Appropriately zoned lands shall be allocated as the need for multiple residential development increases.

14.6 SINGLE-FAMILY RESIDENTIAL

14.6.1 Introduction and Analysis

As part of the overall land use structure of the County, the single-family residential district provides areas for low-density residential uses. The location of single-family residential lands is important in that they should be in close proximity to centers of employment, shopping and other conveniences, and have the basic improvements and amenities necessary for development.

As has been the case in the past, uncontrolled single-family residential development will place a burden on the County and its residents. Before the Subdivision and Comprehensive Zoning Codes were adopted in 1966 and 1967-68 respectively, thousands of non-conforming residentially-sized lots were created in isolated areas without the basic infrastructure and amenities for development. These lots were then sold with no prospect of improvements to these facilities.

Housing in Hawaii County has traditionally been characterized by single-family residential units. Residential units of this sort account for 80.5 per cent of the total housing inventory of the island. In 1997, the County of Hawaii had an estimated 43,979 single-family residential units. With the anticipated increase in population and the replacement of substandard units, more residential units will be needed. Rehabilitation, renewal or redevelopment will be required in many of the older single-family residential neighborhoods.

The County has approximately 20,189 acres zoned for single-family residential use at varying densities. Several areas, however, are occupied by incompatible non-conforming uses, undevelopable because of topographic conditions, their location in hazardous areas, or without the basic improvements necessary for development.

The prices of these single-family residential zoned lands differ substantially depending on location. For example, single-family residential zoned lands along beachfronts are usually more expensive than the mauka residential zoned areas. The cost of acquiring and/or constructing a home remains cost prohibitive for many residents. One of the avenues that have been adopted to alleviate this problem is the construction of ohana dwellings.

The 1981 session of the Legislature of the State of Hawaii had recognized that the spiraling cost of housing, the limitations of land for housing, and the failure of wages to keep pace with inflation, had contributed to the inability of many families to purchase homes. Thus, the ohana dwelling provisions of Act 229, 1981 Session Laws of Hawaii (SLH), and the subsequent amendment to the Zoning Code allows the construction of a second dwelling on lots where one dwelling is already permitted. However, this is only provided after the county determines that adequate facilities exist and provided

that there are no deed restrictions prohibiting the construction of a second dwelling. This substantially alters the concept of a "single family residential zone." The net effect of these laws has been to increase the density of neighborhoods without overt rezoning actions.

Through careful examination and analysis of the present situation, the following goals, policies, and standards are set forth to guide the orderly development of single-family residential areas in the interest of the residents of the County.

14.6.2 Goals

- (a) To maximize choices of single-family residential lots and/or housing for residents of the County.
- (b) To ensure compatible uses within and adjacent to single-family residential zoned areas.
- (c) To rehabilitate and/or rebuild deteriorating single-family residential areas.
- (d) To provide single-family residential areas conveniently located to public and private services, shopping, other community activities and convenient access to employment centers that takes natural beauty into consideration.
- (e) To enhance the overall quality of life in our residential communities.

14.6.3 Policies

- (a) To assure the orderly use of single-family residential zoned areas and to curb speculation and resale of undeveloped lots, the County may impose incremental and conditional zoning, which would be based on performance requirements. This is to assure that a certain percentage of buildings will be constructed.
- (b) Encourage innovative uses of land with respect to geologic and topographic conditions through the use of residential cluster and planned unit developments.
- (c) Encourage and coordinate with the State in providing fee simple and leasehold single-family residential lots to the residents through State and/or County Housing Programs.
- (d) Incorporate reasonable flexibility in codes and ordinances to achieve a diversity of socio-economic housing mix and to permit aesthetic balance between single-family residential structures and open spaces.
- (e) Re-evaluate existing undeveloped single-family residential zoned areas and reallocate zoned lands in appropriate locations.
- (f) Designate and allocate single-family residential zoned lands at varying densities for future use in accordance with the needs of the communities and the stated goals, policies, and standards.

§14.6.4: Standards

- (g) Rural-style residential-agricultural developments, such as new small scale rural communities or extensions of existing rural communities, shall be encouraged in appropriate locations.
- (h) Review and amend land use ordinances and codes to include considerations for rural-style residential subdivisions in appropriate locations. Standards and criteria for the establishment of these areas shall be developed.
- (i) Require developers to provide basic infrastructure necessary for development.

14.6.4 Standards

- (a) There shall be a transitional area between single-family residential areas and incompatible uses.
- (b) Major traffic routes shall not be located through single-family residential areas.
- (c) Areas shall have basic improvements and amenities necessary for immediate use.

14.6.5 Districts

The following is an analysis by district in reference to single-family residential development. The brief analysis is intended to bring into focus the relationship of the district to the County as a whole.

14.6.5.1 PUNA

14.6.5.1.1 Profile

The Puna district has approximately 2,677 acres zoned for single-family residential use.

The district has thousands of non-conforming residential-sized lots that lack the basic infrastructure necessary for development and/or are held in speculation. Nevertheless, construction of single-family dwellings within these non-conforming subdivisions has increased. The district is a bedroom community to the Hilo area.

14.6.5.1.2 Courses of Action

- (a) Work with community groups to explore possible avenues for financing infrastructural improvements within the non-conforming subdivisions.
- (b) Encourage and aid the agricultural industry in continuing to provide employee housing.
- (c) Improve and develop roadways, water and sewerage systems, and other basic facilities necessary to encourage development of lands suitable for residential use.

14.6.5.2 SOUTH HILO

14.6.5.2.1 Profile

The South Hilo district has approximately 8,374 acres of single-family residential zoned lands. Many of the undeveloped areas lack the basic improvements necessary for development, are held in speculation, or are committed to other uses. Drainage and flooding problems exist in many of the areas zoned for residential use.

In addition to private developers, government has played an important role in single-family residential housing. Previously, the State has made available hundreds of housing units in Hilo for low and moderate income families.

14.6.5.2.2 Course of Action

- (a) Improve substandard residential roadways through the County's Capital Improvement Program or by Improvement District.

14.6.5.3 NORTH HILO

14.6.5.3.1 Profile

The North Hilo district has approximately 391 acres zoned for single-family residential use. Some of this area is undeveloped because of unfavorable topographic conditions and the lack of basic infrastructure necessary for development. Single-family residential zoned lands are also located adjacent to former sugar processing plants.

14.6.5.3.2 Courses of Action

- (a) Encourage more innovative types of housing developments, such as cluster and planned unit developments.
- (b) Urban areas shall continue to be Ninole and Ookala as well as the Laupahoehoe-Papaaloa area.

14.6.5.4 HAMAKUA

14.6.5.4.1 Profile

The former plantations that were in operation in the area have heavily influenced the settlement pattern of the Hamakua district. The sugar plantations in the area were the primary employers in the Hamakua district. However, as Hawaii neared the end of the millennium, the plantations also approached the end of their era. Slowly, plantations began to close until the Hamakua Sugar Company finally ceased operations in 1994. After the closing of the plantation and the cessation of its housing programs for its employees, The Office of Housing and Community Development coordinated the use of federal funds to subdivide the Hamakua Sugar Plantation camps into individual house lots. Assistance towards obtaining title to the newly created house lots was provided

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to those employees who participated in the final harvest. Furthermore, Office of Housing and Community Development (OHCD) established a program that provided grants to those qualified owners of plantation homes to conduct emergency repairs to their homes. Other programs included the design of the Ookala and Paauilo water distribution system, training for six newly formed community associations, and the closing of existing gang cesspools and sewage lagoons.

The Hamakua district has 631 acres allocated for single-family residential use. Some residential zoned lands are located adjacent to the former sugar processing plant and certain areas have drainage problems. With the anticipated level of growth in population and economic activity, the current number of single family residential zoned land should be sufficient. However, the County shall allocate more land in this zone should the need arise.

14.6.5.4.2 Course of Action

- (a) Designate lands for single family use as the need arises.

14.6.5.5 NORTH KOHALA

14.6.5.5.1 Profile

The North Kohala district has approximately 652 acres allocated for single-family residential use. Many of the undeveloped residential zoned areas are unsuitable for residential development because of unfavorable topographic conditions. Strip residential development also exists along the roadways.

14.6.5.5.2 Course of Action

- (a) Aid and encourage major landowners to make available residential lands in the area for employee housing and the private market.

14.6.5.6 SOUTH KOHALA

14.6.5.6.1 Profile

The district has approximately 3,382 acres of single family residential zoned lands, primarily located in the Waimea area and in Waikoloa Village. Several areas already zoned for single-family residential use are not being developed because of the lack of basic improvements or the lack of a market.

14.6.5.6.2 Course of Action

- (a) Encourage the development of appropriately located and serviced State-owned, Hawaiian Home Lands and privately-held lands for houselots.

14.6.5.7 NORTH AND SOUTH KONA

14.6.5.7.1 Profile

The North and South Kona districts have approximately 3,301 acres zoned for single-family residential use. Some of the undeveloped residential lands are unsuitable for development due to unfavorable topographic conditions. Inadequate roadways and the lack of basic facilities are two principle reasons for residential zoned lands not being developed.

Because of topographic conditions, there are drainage and flooding problems in certain residential areas. Incompatible non-conforming uses exist within residential zoned areas and there are also residential areas located adjacent to industrial zoned lands.

14.6.5.7.2 Courses of Action

- (a) Encourage the development of appropriately located and serviced privately-held and State-owned lands for houselots.
- (b) Improve and develop roadways, water and sewerage systems, and other basic facilities necessary to encourage development of lands suitable for residential use.
- (c) Encourage the concentration of residential structures to avoid strip residential development.
- (d) Encourage the use of more innovative types of housing development, such as zones of mix and cluster and planned unit developments.

14.6.5.8 KA'U

14.6.5.8.1 Profile

The district of Ka'u has approximately 781 acres allocated for single-family residential use, primarily located in the towns of Naalehu, Pahala and at Punalu'u.

The sugar company actively pursued subdivisions to provide fee simple residential lands to their employees. These subdivisions were primarily provided for relocation purposes. Since many of the single-family residential zoned lands were held in plantation ownership, only a limited supply were available on the private market. Like Hamakua, many of the towns that were established in Ka'u were a direct result of the influence of the former sugar plantations that once existed in the region. Prior to its closing in 1996, Ka'u Agribusiness engaged in housing development with the State Housing and Community Development Corporation of Hawaii to construct housing for its employees. Over the years, this effort has increased fee ownership of homes from 42 per cent in 1970 to 94 per cent in 1997.

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The district also has non-conforming residential subdivisions lacking the basic improvements necessary for development.

14.6.5.8.2 Course of Action

- (a) Aid and encourage major landowners to make available residential lands in the area for employee housing and the private market.

14.7 RESORT

14.7.1 Introduction and Analysis

Resort developments are intended to satisfy the needs and desires of both visitors and residents. Such areas have basic amenities and attributes that support visitor accommodations and related facilities.

Most successful resort areas have a harmonious combination of certain characteristics, such as climate, scenery, and/or man-made facilities. In most instances, the natural factors have been the basis for the development of an area and the man-made facilities were designed to enhance the area. Buildings and landscaping are generally designed to enhance the site and area. In other cases, man-made features enhance what may be considered undistinguished physical features.

Generally, several factors in combination with one another contribute to the growth of a visitor industry in a given area. These factors include:

The amenities that an area has to offer including its beaches, scenic attractions, and recreational facilities and activities.

The community providing support for the industry.

Both the public and private sectors providing the needed infrastructure improvements (such as airports, water and sewer systems, and road improvements) and other support services.

The private sector developing a concentration of visitor accommodations in an area.

The participation of hotel operators with strong ties to national and international markets.

The successful promotion of an area as a destination and the participation in the promotional effort by airlines and travel agents.

The County has several natural advantages, including its climate, topography and scenic qualities that provide the setting desired for resort development. With proper plan-

§14.7.1: Introduction and Analysis

ning, resort development can have a positive impact on the island's social, economic and physical environment, and the visitor industry as well. A resort area should be large enough to provide a concentration of hotel and recreational facilities that will keep the visitor interested and entertained. It should not be so large, however, as to destroy either the sense of scale, intimacy and leisure associated with an area or the way of life on an island.

The visitor industry is generally regarded as the primary catalyst of economic and population growth throughout the State and particularly the Neighbor Islands. The visitor industry is the driving force of the economy for the State of Hawaii and contributes \$14.6 billion of economic activity, employs nearly 180,000 people, accounts for 28 per cent of statewide tax revenues, and contributes nearly 28 per cent of the Gross State Product. The total number of overnight visitors to the State has increased from 4.9 million in 1985 to 6.7 million in 1998. The number of visitor arrivals to Hawaii County increased from 760,000 in 1985 to 1.27 million in 1998. These statistics do not reflect visitor arrivals from cruise ships.

The total statewide westbound visitors in 1998 was 4.2 million. The Big Island accounted for 22.8 per cent of this figure with 961,400 westbound visitors. The majority of the westbound visitors originated from the United States with others from Canada, Europe and other countries.

The majority of eastbound visitors originated from Japan as well as Korea, China, and other Asian countries. The total statewide eastbound visitors was 2.5 million in 1998. The island of Hawaii accounted for 12.4 per cent of this figure with 309,000 eastbound visitors.

Accompanying this growth in visitor arrivals has been the development of additional visitor accommodations, particularly on the Neighbor Islands. Based on data from the Hawaii Visitors and Convention Bureau, the State's visitor room inventory increased 65,919 in 1985 to 71,480 in 1998. Hawaii County's visitor room inventory increased from 7,511 in 1985 to 9,655 in 1998. The visitor accommodation units include hotels, resort condominiums, apartment hotels, bed and breakfast operations, hostels, and individual vacation units. The bed and breakfast operation in the County, although not significant to the total visitor unit count, has been a fast-growing segment of the visitor industry.

In 1969, the County of Hawaii had 677 acres zoned for resort use. By 1985, the zoned acreage had increased to 793 acres. The total acreage zoned for resort use in 2000 was approximately 1,353 acres.

The County's existing primary resort centers are located along the coastal areas of Hilo in East Hawaii, and North Kona and South Kohala in West Hawaii. The majority of

§14.7.2: Goals

future resort developments are proposed in the North Kona and South Kohala districts.

Although resort development has traditionally been located in coastal areas, smaller-scale resort projects such as mountain and retreat resort complexes may be developed in the future. In recent years, niche tourism markets, such as eco-tourism and health and wellness tourism have established themselves throughout the island. Niche markets for these types of tourism have growth potential by promoting the abundance of natural, historical and cultural resources this island has to offer. While most of the larger resorts focus upon recreational opportunities offered by the island's coastal resources, these niche tourism markets also take advantage of other natural and cultural resources available from various locations throughout the County.

How and where future resort development occurs will depend to a large extent on the County. Although the County is faced with differences of opinion from its residents concerning resort development, the benefits that can be derived from resort development may be optimized and the adverse affects minimized. Developers and residents must be made aware of the circumstances resulting from resort development. Citizen participation, awareness, and most of all, understanding are vital in resort development, as in all phases of the planning process.

14.7.2 Goals

- (a) Maintain an orderly development of the visitor industry.
- (b) Provide for resort development that maximizes conveniences to its users and optimizes the benefits derived by the residents of the County.
- (c) Ensure that resort developments maintain the cultural and historic, social, economic, and physical environments of Hawaii and its people.

14.7.3 Policies

- (a) The County may impose incremental and conditional zoning that would be based on performance requirements.
- (b) Promote and encourage the rehabilitation and the optimum utilization of resort areas that are presently serviced by basic facilities and utilities.
- (c) Lands currently designated Resort should be utilized before new resorts are allowed in undeveloped coastal areas.
- (d) Zoning of resort areas shall be granted when the proposed development is consistent with and incorporates the stated goals, policies and standards of the General Plan.
- (e) Continue to seek funds from the State Capital Improvement Program to help develop visitor destination areas in accordance with the County's General Plan.

- (f) Designate and allocate future resort areas in appropriate proportions and in keeping with the social, economic, and physical environments of the County.
- (g) Evaluate resort areas and the areas surrounding existing resorts to insure that viable quality resorts are developed and that the surrounding area contributes to the quality, ambience and character of the existing resorts.
- (h) Encourage the visitor industry to provide resort facilities that offer an educational experience of Hawaii as well as recreational activities.
- (i) Coastal resort developments shall provide public access to and parking for beach and shoreline areas.
- (j) Re-evaluate existing undeveloped resort designated and/or zoned areas and reallocate these lands in appropriate locations.
- (k) Require developers to provide the basic infrastructure necessary for development.

14.7.4 Standards

The following established standards shall guide the development of resort areas.

(a) Major Resort Area

A major resort area is a self-contained resort destination area that provides basic and support facilities for the needs of the entire development. Such facilities shall include sewer, water, roads, employee housing and recreational facilities, etc. A major resort area is designated as a Resort node or part of a Resort node on the Land Use Pattern Allocation Guide Map.

- Maximum visitor units: 3,000 units.
- Resort acreage: 90 acres minimum.
- Active and passive recreation areas: 50 acres minimum.
- Either participate in an off-site housing program or a maximum of 640 acres for residential use when other zoned lands are not available in close proximity for support use.
- The required employee housing ratio and method of provision shall be determined by an analysis of housing needs of each district or relative area and with the adoption of the resort zoning; provided that the ratio shall not exceed one employee unit for every two visitor units built.

(b) Intermediate Resort Area

An intermediate resort area is a self-contained resort destination area that provides basic and support facilities for the needs of the entire development on a smaller scale than a major resort area. Such facilities shall include sewer, water, roads, employee housing and recreational facilities, etc.

- Maximum visitor units: 1,500 units.

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- Resort acreage: 45 acres minimum.
- Active and passive recreation area: 25 acres minimum.
- Either participate in an off-site housing program or a maximum of 320 acres for residential use when other zoned lands are not available in close proximity for support use.
- The required employee housing ratio and method of provision shall be determined by an analysis of housing needs of each district or relative area and with the adoption of the resort zoning; provided that the ratio shall not exceed one employee unit for every two visitor units built.

(c) Minor Resort

A minor resort area shall not exceed the density of an intermediate resort area.

- Maximum visitor units: 500 units.
- Provide active and passive recreation area commensurate with the scale of development.
- The required employee housing ratio and method of provision shall be determined by an analysis of housing needs of each district or relative area and with the adoption of the resort zoning; provided that the ratio shall not exceed one employee unit for every two visitor units built.

(d) Retreat Resort Area

A retreat resort area is generally an area that provides the user with rest, quiet and isolation for an environmental experience. It shall have sewer, water, roads, employee housing, and recreational facilities, etc.

- Maximum visitor units: 50 units.
- Resort acreage: 15 acres minimum.
- Provide active and passive recreation area commensurate with the scale of development.
- The required employee housing ratio and method of provision shall be determined by an analysis of housing needs of each district or relative area and with the adoption of the resort zoning; provided that the ratio shall not exceed one employee unit for every two visitor units built.

14.7.5 Districts

The following is an analysis by district in reference to resort development. The brief analysis of each district is intended to bring into focus the relationship of the district to the County as a whole.

14.7.5.1 PUNA

14.7.5.1.1 Profile

The visitor industry in the Puna district is primarily comprised of bed and breakfast visitor units. A drive-in restaurant currently occupies the district's only resort-zoned area of one acre located in Kaimu. The principal visitor attraction in the region is the Kalapana Extension of the Hawaii Volcanoes National Park.

Although resorts have been proposed previously in the Kaimu-Kalapana, Kapoho, Po-hoiki, and Opihikao areas, none of these have materialized. These areas are also subject to volcanic activities, subsidence, and tsunami inundation. These areas also lack most of the basic infrastructure improvements necessary for development.

14.7.5.1.2 Courses of Action

- (a) The development of visitor accommodations and any resort development in the district shall complement the character of the area.
- (b) Consider the development of small family or 'bed and breakfast' type visitor accommodations and small-scale retreat resort development.

14.7.5.2 SOUTH HILO

14.7.5.2.1 Profile

In the early 1970s, Hilo was envisioned as the gateway to the Island of Hawaii for overseas visitors. In anticipation of that status, the Hilo International Airport terminal was modernized and the runway modified for jumbo aircraft. The anticipated flow of overseas visitors, however, did not materialize.

Hilo continues to attract its share of visitors with approximately 30 per cent of the island's total visitor count. The Hilo area also accommodates a substantial number of business travelers as well as local travelers attending special events such as sporting events and hula competitions. The visitor industry in South Hilo will continue to service the transient visitors, business travelers, and local residents.

The visitor plant inventory indicates that in 1960 there were 376 hotel units, increasing to 1,247 in 1970 and 1,313 units in 1985. South Hilo's visitor accommodations have declined to 1,165 visitor units in 1998. The majority of Hilo's existing inventory of visitor units are located in the Waiakea Peninsula resort area.

The Hilo area has approximately 136 acres zoned for resort use.

14.7.5.2.2 Courses of Action

- (a) Re-evaluate areas currently zoned for resort use.

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- (b) Continue to improve roadways and sewer and water systems in all areas where high density resort uses are allowed.

14.7.5.3 NORTH HILO

14.7.5.3.1 Profile

Presently, the visitor industry plays no significant role in the area as areas of interest to visitors are limited. In the foreseeable future, resort development in the North Hilo district is unlikely.

14.7.5.3.2 Course of Action

- (a) Encourage the development of small-scale visitor related facilities near points of interest.

14.7.5.4 HAMAKUA

14.7.5.4.1 Profile

The visitor industry in South Kohala has provided employment opportunities for residents of the Hamakua area. Within the district, there is a small hotel located in Honoka'a that is primarily used by local businessmen, construction workers, and travelers. Bed and breakfast operations were also established in parts of the Hamakua district. As of December 2000, there were 42 acres of resort zoned lands in Hamakua. In early 2001, a 15-acre area at Kukuihaele was rezoned to a resort district for the development of a 40-unit retreat resort facility referred to as "The Trees at Kukuihaele." There are also no shoreline areas where resort complexes can be feasibly developed to any substantial degree. Nevertheless, the district does have some visitor attractions. Waipio Valley is a major visitor attraction. Its beauty lies in its naturalness and the general absence of man-made elements. Because access into the valley is poor along a steep and dangerous road, the valley itself is not a suitable location for visitor-oriented commercial facilities and accommodations. Honoka'a town offers a different visitor attraction with its main street setting of 1930's commercial buildings.

14.7.5.4.2 Courses of Action

- (a) Encourage the development of small family-operated hotels.
- (b) Consider small-scale retreat resort development.
- (c) Encourage resort development that enhances the natural beauty of the area.

14.7.5.5 NORTH KOHALA

14.7.5.5.1 Profile

The district of North Kohala provides overnight accommodations for local travelers. Chalon International, Inc., a major landowner in the North Kohala district, obtained rezoning of approximately 15 acres of land in 1993 for the development of a 200 to 240-unit lodge hotel at Mahukona. No activity towards the development of the lodge hotel has occurred to date.

In addition to being an agricultural community, there are those who live in this district and commute to work at the South Kohala resorts.

The district does have potential for resort development catering to visitors seeking quiet and rest. There are areas of historical significance and natural beauty in North Kohala.

14.7.5.5.2 Courses of Action

- (a) Encourage the development of small family type hotels and bed and breakfast establishments.
- (b) Consider small-scale retreat resort development that is consistent with the rural character and cultural lifestyle of the district.

14.7.5.6 SOUTH KOHALA

14.7.5.6.1 Profile

There are 360 acres zoned for resort use in South Kohala.

The South Kohala coast has developed into a major destination resort area for the island of Hawaii, as well as the State. The three major developers of the area are Mauna Kea Properties, Mauna Lani Resort, and Waikoloa Land Company. The major hotels within these developments are the Mauna Kea Beach Hotel, Hapuna Prince Hotel, Mauna Lani Bay Hotel and Bungalows, The Orchid at Mauna Lani, Hilton Waikoloa Village, and The Outrigger Waikoloan Beach Hotel. The number of hotel rooms within these three resort nodes totals over 3,250.

A limited number of visitor accommodations are also available in Waimea. Some visitor units are also available within the Waikoloa Village.

The South Kohala resorts greatly benefited from the direct flights to Kona International Airport at Keahole from Japan and the mainland United States. These direct flights significantly increased the number of visitors to the South Kohala resort destination areas. As a result of these direct flights and the potential for growth of future visitor accommodations, the visitor industry at the South Kohala coast should expand. The

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excellent climatic conditions of the area and its ease of access from the Kona International Airport at Keahole provide an optimistic future for the South Kohala coast's major resort destination area.

14.7.5.6.2 Course of Action

- (a) Adequate access, sewer and water systems, and other basic amenities shall be provided in all areas where higher density uses are allowed.

14.7.5.7 NORTH KONA

14.7.5.7.1 Profile

The district of North Kona has historically been the focus of resort activity on the Island of Hawaii. The initial development occurred in the Kailua-Kona area with a small number of visitor accommodations. Few of these hotels contained the full range of resort amenities. As the tourism industry expanded, the character of the Kailua-Kona area has changed. Today, visitor accommodations and facilities extend from the Keauhou-Kona Resort at the southern end of the North Kona district to the Hualalai Resort and Kona Village Resort at the northern end.

Keauhou-Kona Resort is master-planned and developed as a resort/residential community that offers the full range of resort amenities including golf courses, tennis facilities, shopping center and entertainment facilities. The recently refurbished Aston Keauhou Beach resort is part of the Keauhou-Kona Resort. There are two resort-zoned sites at Keauhou-Kona Resort, totaling 59 acres that have yet to be developed.

The Hualalai Resort and the Kaupulehu Development's Project District will be developed as another master-planned resort/residential community. The 243-room Four Seasons Hualalai opened in 1996. Other developments in the area include a championship golf course, condominium and single-family residential units, and other support amenities.

The visitor units in the North Kona district include over 2,180 hotel rooms and approximately 1,465 resort condominium units. Approximately 500 units are operated as timeshare units, including the 263-unit Kona Coast Resort at Keauhou-Kona Resort, the largest time share project. A number of bed and breakfast units have also been established.

There are 740 acres zoned resort in the North Kona District. However, not all of the acres zoned for resort are actually utilized for hotels. Multiple family residential uses and single family residential uses have been established on some of the resort zoned lands. According to the 1998 data from the Hawaii Visitors and Convention Center, the North Kona district has the largest inventory of visitor units on the island. The 4,399 units include a broad range of accommodations, ranging from hotels to bed and breakfast establishments. Some of the older hotels are in need of major refurbishment.

14.7.5.7.2 Courses of Action

- (a) Discourage strip resort development along Alii Drive.
- (b) Re-evaluate some areas currently zoned for resort use.
- (c) Improve and provide adequate roadways, sewer and water systems, and other basic amenities in all areas where higher density uses are allowed.

14.7.5.8 SOUTH KONA**14.7.5.8.1 Profile**

The South Kona district has limited visitor accommodations. There is one hotel with 64 units that is primarily used by local residents. Some bed and breakfast operations have also been established in recent years. An 80-unit private member's lodge is proposed on a 14-acre area within the Hokulia development project. The Land Use Pattern Allocation Guide map was amended in 1997 to reflect the resort use. This area was also rezoned to the resort district in 1997. There are no other resort zoned lands within the South Kona district.

14.7.5.8.2 Courses of Action

- (a) Developments shall blend in with the character of the area.
- (b) Encourage the development of small family-operated hotels or bed and breakfast accommodations.

14.7.5.9 KA'U**14.7.5.9.1 Profile**

Tourism activity in the Ka'u district has been limited to Punaluu and the Volcano areas. The Punalu'u Resort, formerly known as SeaMountain, has 56 condominium units, tennis, golf and retreat conference facilities in need of repair. This resort generally caters to those wishing a relatively quiet and isolated vacation experience.

The 12-unit Shirakawa Motel in Waiohinu also serves local travelers. The 37-unit Volcano House within the Hawaii Volcanoes National Park caters largely to those wishing to explore the National Park. The hotel also manages cabins within the park. These are available to visitors who prefer a more "wilderness" experience. A number of bed and breakfast operations have been established within the district, particularly the Volcano area.

There are approximately 45 acres zoned resort in the district.

14.7.5.9.2 Courses of Action

- (a) The development of visitor accommodations and any resort development shall complement the character of the area.
- (b) Encourage the development of small family or "bed and breakfast" type visitor accommodations.

14.8 OPEN SPACE

14.8.1 Introduction and Analysis

A vital part of the environment, open space is land that is basically not used for buildings or structures and is characterized by scenic beauty, existing openness, and natural conditions. It is the counterpart of development. Retained in its state of use, open space would maintain and/or enhance the conservation of needed or desired natural, scenic, or historical resources that might otherwise be permanently lost. It would also enhance the present or potential value of abutting or surrounding urban development.

Open space is used to maintain and/or provide forestry pursuits, water supply, fish and marine protection, wildlife and endemic plant preservation, recreational pursuits and visual and scenic amenities. Open space also demarcates potential natural hazard areas. Just as the use of open space is affected by development, so is the character and quality of development influenced by what is done with open space.

Three basic functions are served by open space. Positive human needs such as active and passive recreation amenities can be provided. The natural resource base such as air, water, soil and plants can be protected and enhanced. Economic development decisions, e.g. tourism, real estate values and development patterns, can be affected.

The planning of open space is an integral part of any comprehensive planning consideration. Other elements of the General Plan affect or are affected by this element. Together, these elements and their interrelationships form an overall picture of the County of Hawaii.

Open space on the island of Hawaii consists of lands zoned as Open by the County as well as those in the State Land Use Conservation District. The "Open" zoning district permits golf courses, with a use permit, some recreational facilities, and various public and utility-type facilities. There is currently no County zoning district that calls for land to be preserved in a largely natural state.

Various categories of open space areas have been designated according to use or amenities. Restricted watershed areas are strictly regulated in order to protect the island's essential water resources. Some of these are in close proximity and easy accessibility to development and without protection could be contaminated. All watershed

areas are in forest reserves under the jurisdiction of the State Department of Land and Natural Resources.

Potential natural hazard areas are designated as open space for the welfare and safety of the public. These include areas that are highly susceptible to flooding, erosion, volcanic activity and tsunami inundation.

The following goals, policies, and standards are set forth to insure the protection and wise use of open space in the County of Hawaii.

14.8.2 Goals

- (a) Provide and protect open space for the social, environmental, and economic well-being of the County of Hawaii and its residents.
- (b) Protect designated natural areas.

14.8.3 Policies

- (a) Open space shall reflect and be in keeping with the goals, policies, and standards set forth in the other elements of the General Plan.
- (b) Open space in urban areas shall be established and provided through zoning and subdivision regulations.
- (c) Encourage the identification, evaluation, and designation of natural areas.
- (d) Zoning, subdivision and other applicable ordinances shall provide for and protect open space areas.
- (e) Amend the Zoning Code to create a category for lands that should be kept in a largely natural state, but that may not be in the Conservation District, such as certain important viewplanes, buffer areas, and very steep slopes.

14.8.4 Standards

Open Space designations shall include:

- (a) Forest Reserves
- (b) Water Areas
- (c) Potential Natural Hazard Areas
- (d) Natural Areas and Reserves
- (e) Open Space Recreation Areas
- (f) Scenic Vistas and Viewplanes
- (g) General Use Conservation Sub-zones with Compatible Uses
- (h) Scientific Areas, including Habitats of Endemic Species

14.9 PUBLIC LANDS

14.9.1 Introduction and Analysis

The utilization of land resources in Hawaii is greatly influenced by the policies and practices of a relatively small number of major landowners. Approximately 52 per cent of the total land area in the State of Hawaii is government-owned. Federal lands constitute 8 per cent of these government-owned lands while State lands, including those of the Department of Hawaiian Homes Lands, comprise the remaining 34 per cent. Of the 48 per cent in private ownership, approximately three-fourths are owned by approximately fifty large landowners.

The degree to which private and public lands can be put to their respective designated and zoned uses will determine the effectiveness of the General Plan. The historical pattern of land ownership in specific situations may adversely affect the realization of stated objectives and goals.

County-owned lands amount to less than 1 per cent of the total land area of the island. State owned lands account for 44 per cent of the County's 2.5 million acres, with district proportions ranging from a low of 17 per cent in South Kona to a high of 76 per cent in North Hilo. State lands include a variety of uses such as commercial, industrial, residential and resort uses and education and research in South Hilo to wilderness areas and mountain tops in Hamakua and Ka'u.

Federal lands in the County of Hawaii include the Hawaii Volcanoes National Park and the National Historic Parks at Pu'uukohola and Honaunau, both of which are established programs of the National Park Service of the U.S. Department of Interior. The National Park Service proposes to acquire additional lands for the expansion of the Hawaii Volcanoes, Puukohola and Puuhonua O Honaunau National Historic Parks at Kahuku, Kohanaiki, and Kiilae, respectively.

Public trust or ceded lands in Hawaii comprise approximately 1.8 million acres of property throughout the State, or 43 per cent of the State's total land area. These lands were "ceded", or transferred, to the United States by the Republic of Hawaii, under the 1898 annexation of Hawaii as a Territory of the United States and after the 1893 overthrow of the Hawaiian Kingdom. The Admissions Act of 1959 that granted Hawaii statehood, defined the State as trustee for 1.4 million acres of these ceded lands and defined five purposes for its use, including one for the betterment of conditions for native Hawaiians. The 1963 Ceded Lands Act allowed the transfer of title to the State of all but 300,000 acres of ceded lands that were excepted by the Federal government. In 1978, voters approved constitutional amendments to create the Office of Hawaiian Affairs and fund it with a share of the money derived from the use of ceded lands. In 1980, the Legislature defined the Office of Hawaiian Affairs' share of ceded land revenues at 20 per cent. The exact amount of ceded lands within the County is currently

unknown. Act 125 was adopted by the 2000 Legislature to facilitate the establishment of a comprehensive information system for inventorying and maintaining information about these ceded lands.

The use of publicly owned lands needs to be more judiciously administered. There is at present no master plan for the vast public lands; namely those that are designated Conservation, over which the County has virtually no administrative jurisdiction.

The County acquires land for public uses such as parks and rights-of-way. Presently there is no County agency whose function is to expedite land acquisitions. Various County departments are involved, depending on the nature of acquisition. There is also a need for an agency to keep abreast of and initiate various programs on public land.

The University of Hawaii, as a corporate body under the State Constitution, holds a unique position on land ownership unlike other State or County agencies that utilize public lands. The University, under the State Constitution, obtains in fee title the land granted it by Executive Order. The University can therefore subdivide, lease or sell its lands provided it is in the interest of public education.

14.9.2 Goals

- (a) Utilize publicly owned lands in the best public interest and to the maximum benefit for the greatest number of people.
- (b) Acquire lands for public use to implement policies and programs contained in the General Plan.

14.9.3 Policies

- (a) Encourage uses of public lands that will satisfy specific public needs, such as housing, recreation, open space and education.
- (b) Encourage the adoption of State programs for State lands consistent with the General Plan.
- (c) State and County Capital Improvement Programs should continue to be coordinated.
- (d) A sub-classification, University use, shall continue to be utilized, permitting the primary institutional and numerous supportive and accessory uses required for establishing and/or expanding a public university. Its designation shall continue to be shown on the Land Use Pattern Allocation Guide map.
- (e) Support the U.S. Department of Interior, National Park Service's expansion plans for the Hawaii Volcanoes, Puukohola and Puuhonua O Honaunau National Historic Parks.
- (f) Encourage the State to continue the Villages of Lai'opua project at Kealakehe.

§14.9.4: Standard

14.9.4 Standard

- (a) Public lands with unique recreational and natural resources shall be maintained for public use.



PLAN IMPLEMENTATION

The General Plan sets forth broad goals, objectives, and policies. Implementation requires translating these broad statements to specific actions, systematically evaluating progress, and active community participation. In this regard, follow-up planning efforts will involve the preparation of Community Development Plans, Capital Improvements Program, and an annual report.

15.1 COMMUNITY DEVELOPMENT PLANS

The Community Development Plans are intended to be the forum for community input into managing growth and coordinating the delivery of government services to the community. The Community Development Plans will translate the broad General Plan statements to specific actions as they apply to specific geographical areas.

A Community Development Plan should direct physical development and public improvements within a specific area. The Community development Plan may contain detailed land use and zoning guide maps, plans for roadways, drainage, parks, and other infrastructure and public facilities, architectural design guidelines, planning for watersheds and other natural features, and any other matters relating to the planning area.

The Planning Director or Council may initiate a Community Development Plan. Each Community Development Plan shall have a steering committee composed of members appointed by the mayor and confirmed by the council. The members shall be broadly representative of the affected communities.

The steering committee shall work in conjunction with the Planning Department and with any professional consultants hired to assist in the preparation of the plan. The exact boundaries of the planning area may be determined during the preparation of the plan.

It is not mandatory that there be a Community Development Plan for each region. Although the previous General Plan called for Community Development Plans, in the thirty years since the enactment of the first General Plan, only one Community Development Plan has been enacted by ordinance, one by County Council Resolution, and two by Planning Commission Resolution. Time, cost, the degree of effort, and, in some cases, the inability to achieve a sufficient consensus, has been the limiting factors.

§15.1: Community Development Plans

The need for a Community Development Plan for a particular area should be assessed considering a number of factors, including how much is public infrastructure challenged by recent or anticipated growth and whether there are significant efforts to change the zoning and land use in the area.

After the steering committee has recommended approval of the Community Development Plan, it shall be forwarded to either the Windward or Leeward Planning Commission, or both meeting as a joint commission as provided for in the Hawai‘i County Charter, for review and recommendation to the County Council. The County Council may modify or amend the Community Development Plan before enacting it by ordinance, but it shall give the steering committee and the designated Planning Commission, or joint commission, as the case may be, an opportunity to review and comment upon substantive amendments and modifications before final adoption of the plan.

In the process of creating the Community Development Plan, it may be determined that the General Plan should be amended. The Planning Director or County Council may initiate amendments to the General Plan, and the steering committee may recommend amendments, that would be enacted at the same time as the Community Development Plan, or as a follow-up to the Community Development Plan. If there is a direct conflict between the Community Development Plan and the General Plan, the General Plan shall be controlling.

The Community Development Plans shall focus on action. The courses of action specified in each element of the General Plan need greater detail and need to be coordinated by district. The Community Development Plans shall identify appropriate governmental actions that include:

- Regulatory actions. Regulations rely on government's police power to control what people can and cannot do in the interest of the public's health, safety, or welfare. The County administers and enforces various regulations to control land use. These regulations include the zoning code, subdivision code, flood control code, grading code, sign code, and building code. The County also administers requirements imposed by the Federal and State governments, such as the Coastal Zone Management Act and the State Land Use Law. The Community Development Plans shall recommend amendments as appropriate to the codes, maps, or administration and enforcement.
- Incentive measures. Where regulatory controls are the government's “sticks”, incentives are the “carrots” to encourage certain actions. Too often, regulation is the solution. Regulation can be restrictive, reactive, and divisive. Incentive measures, on the other hand, can invite creative “win-win” solutions. Examples of incentive measures include property tax exemptions such as for agricultural or native forest dedications, expedited permit processing, density bonuses, and discounted facility fees. Community Development Plans shall consider appropriate incentive measures to achieve various objectives, as applicable.

- Acquisition actions. Where significant resources are located on private property, it may be more appropriate for government to purchase the development rights or fee simple title rather than to severely regulate the owner's use of the property. Obviously, purchasing in reaction to development proposals is expensive. The Community Development Plans shall identify acquisition priorities, as appropriate, and seek means to leverage financing by working creatively with the landowner, other levels of government, land trusts, and/or nonprofit groups.
- Capital budgeting actions. The County annually prepares a capital improvements budget where public facility projects (new construction or major repairs) are identified. The budget is accompanied by a six-year capital improvements program (CIP). The CIP process is explained in more detail below. The Community Development Plans shall identify and prioritize public facility projects important to the community. The CIP shall take into consideration the recommendations in the Community Development Plans, recognizing that the CIP must reconcile competing interests for a limited amount of funds.
- Programs. Certain community needs do not necessarily require land or a new facility, but rather a focused commitment of time and money towards achieving specific objectives. These operational projects are referred to as programs. Examples include an after-school youth program, neighborhood watch program, or mediation training program. Too often, resources are diverted to studies that could be more effectively used for pilot programs that actually try to achieve results and provide lessons through action. Community Development Plans shall identify desired programs and the community's role in planning and implementing the programs.
- Development/Redevelopment. In very special situations, it may be appropriate for government to take the lead and act as developer either singly or as a public/private partnership. These situations arise when the private market fails to address certain needs, such as very low income housing, or when the situation is quite large-scale, complex, and especially requires government's power of eminent domain to assemble land for redevelopment. Community Development Plans shall identify desired projects for public development or redevelopment, and shall coordinate input from appropriate agencies such as the Office of Housing and Community Development or the U.S. Department of Housing and Urban Development.

15.2 CAPITAL IMPROVEMENTS PROGRAM (CIP)

Capital improvement projects have the potential to influence where growth occurs, to more equitably distribute County services, and to promote important objectives such as affordable housing. The County Charter sets forth the procedure for the submittal and adoption of the CIP:

The various departments and agencies submit project requests and cost estimates to the Mayor. The Planning Director reviews the lists and recommends priorities.

§15.3: Annual Report

The Mayor reviews the lists in preparing the CIP.

- 1 By March 1, the Mayor submits the CIP to the Council together with a message explaining each project proposed in the capital budget, estimated cost, and proposed method of financing.
- 2 4. By May 5, the Mayor may submit amendments (adjustments may be necessary depending on actions taken by the State Legislature) together with a message that describes the changes and the circumstances, which justify the changes.
- 3 On or before June 30, the Council shall adopt the capital budget. The capital budget for the upcoming fiscal year is adopted by ordinance. The six-year CIP is for information purposes.

The capital budget appropriates funds for the specified projects. Capital appropriations lapse at the end of the second fiscal year following the year in which they are appropriated. Prior to lapsing, the agency responsible to implement the project may request the Mayor to allot the funds. Once allotted, the agency may proceed to encumber (e.g., execute contracts, issue purchase orders) and expend the funds.

In order for the CIP to comprehensively prioritize and allocate the financial resources available to the County within the context of the General Plan, the CIP shall be prepared as follows:

- The CIP shall be based on clear priority criteria;
- The CIP shall integrate the several sources of funding improvements, including the fuel tax and the County Water Board projects;
- The CIP shall coordinate County projects with State CIP projects and available Federal funding;
- The total County costs for the projects selected for the CIP shall not exceed an amount that could be prudently financed taking into consideration the debt service capacity of the County;
- The CIP process shall provide opportunity for community review of the CIP proposed by the administration prior to submittal to the County Council;
- Where additional studies are needed to prioritize projects from an islandwide or regional perspective, functional plans may be funded through the CIP;
- A system shall be established to monitor the status of appropriated projects.

15.3 ANNUAL REPORT

The Planning Department shall prepare an annual report to monitor progress towards achieving the General Plan goals, objectives, and policies. To the extent possible, the annual report should develop measurable indicators related to the policies. The Planning Department shall submit the annual report to the Mayor for review. The Mayor shall submit the annual report to the Council together with the capital and operational

budgets in accordance with the budget submittal timetable set forth in the Charter. The annual report and CIP shall be the means to reconcile and prioritize competing community needs from a County-wide perspective. The Planning Department may organize an interagency committee to provide input for inclusion in the annual report.

AMENDMENT PROCEDURES

16.1 COMPREHENSIVE REVIEW

- (1) The Planning Director shall initiate a comprehensive review of the General Plan and prepare a set of recommended amendments for independent review by the Windward and Leeward Planning Commissions and then adoption by the County Council. The recommended amendments shall be submitted to the County Council not more than ten years after the date of adoption of the previous amendments resulting from a comprehensive review.
- (2) The Planning Director shall give notice of the comprehensive review to the County Council, Windward and Leeward Planning Commissions, and the general public. The notice shall state:
 - (a) The general scope of review;
 - (b) The opportunity for the County Council, Windward and Leeward Planning Commissions, and the general public to provide their comments and suggestions to the Planning Director; and
 - (c) The initiation date, general sequence of events, and time for completion of the review period.
- (3) The Planning Director shall establish a deadline for Council-initiated amendments during the comprehensive review which shall be not less than 120 days after the initial notice under section 16.1(2). The County Council may initiate such amendments by resolution.
- (4) The Planning Director shall conduct public workshops on amendments proposed by the Planning Director and by the County Council.
- (5) The public shall be afforded 21 days from the date of the last public workshop to provide comments to the Planning Director.
- (6) The Planning Director shall then submit the amendments proposed by the Planning Director and by the County Council to the Windward and Leeward Planning Commissions for their independent review and separate recommendations within 30 days after the public deadline to submit comments to the Planning Director. The Planning Director shall make a recommendation on any Council-initiated amendments.
- (7) The Planning Director shall notify a property owner of a proposed amendment that would redesignate its property to Open or Conservation, unless the property is already designated Conservation by the State Land Use Commission. Notice shall be given not less than 21 days before the first Windward or Leeward Planning Commission hearing on the proposed amendment.
- (8) The Windward and Leeward Planning Commissions shall conduct and complete their independent review on the proposed amendments to the General Plan, and shall both submit their separate recommendations, within 150 days from the date of receipt of the proposed amendments from the Planning Director.

- (9) The Windward and Leeward Planning Commissions shall each recommend approval of the proposed amendments, in whole or in part, recommend changes, or recommend the rejection of the proposal for changes to the General Plan. If either fails to act on a proposed amendment within the required period, it shall be deemed a negative recommendation from that planning commission only. If both fail to act on a proposed amendment within the required period, such failure to act shall be deemed a negative recommendation from both planning commissions.
- (10) The County Council shall review the amendments submitted and the separate recommendations of the Windward and Leeward Planning Commissions and adopt an amended General Plan. The County Council may make modifications, deletions, or additions to the proposed amendments as it may deem necessary, within the general intent and subject matter of the proposed amendments, in accordance with its rules of procedure. However, any County Council change to a proposed amendment which substantially changes the general intent or subject matter of the proposed amendment, such as newly adding or deleting a goal, policy, or course of action, or standard, or a map amendment which changes a land use designation of a parcel, shall be considered an entirely new proposed amendment. Such a new amendment proposed at this stage shall not be processed as part of the ongoing comprehensive review, but shall be processed as a new interim amendment pursuant to Section 16.2.

16.2 INTERIM AMENDMENTS

- (1) The County Council may initiate interim amendments to the General Plan at any time, except during the comprehensive review pursuant to the following procedures:
 - (a) The County Council may, by resolution, request the Planning Director and Windward and Leeward Planning Commissions to independently review and make separate recommendations on a proposed amendment.
 - (b) The Planning Director shall have 60 days or a longer period, as may be agreed to by the County Council, to submit a recommendation on the proposal to the Windward and Leeward Planning Commissions for their independent review and separate recommendations. The Planning Director's recommendation may include suggested changes consistent with the general intent of the proposed amendment, and the Planning Director shall, if requested by County Council, prepare a draft ordinance to implement the proposed amendment.
 - (c) The Planning Director shall notify a property owner of a proposed amendment that would redesignate its property to Open or Conservation, unless the property is already designated Conservation by the State Land Use Commission. Notice shall be given not less than 21 days before the first Windward or Leeward Planning Commission hearing on the proposed amendment.
 - (d) Each planning commission shall consider the proposed amendment at no less than two meetings, and shall make their separate recommendations on the proposed amendment to the County Council within 60 days from their receipt of the Planning Director's recommendation.
 - (e) If either planning commission fails to act within the required period, it shall be deemed a negative recommendation from that planning commission only. If both planning commissions fail to act on a proposed amendment within the required

period, such failure to act shall be deemed a negative recommendation from both planning commissions.

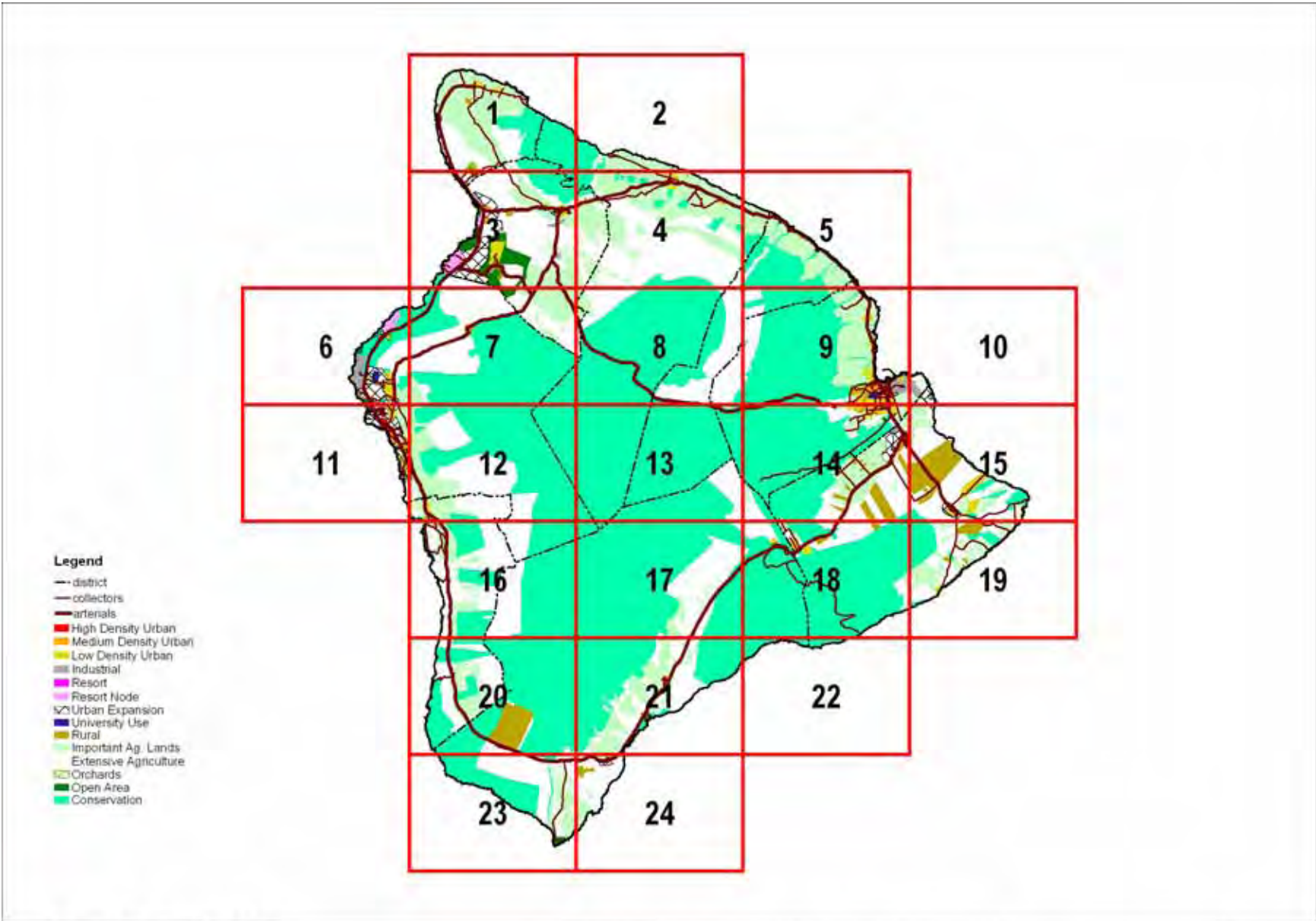
- (f) The County Council may make modifications, deletions, or additions to the proposed amendments as it may deem necessary, within the general intent and subject matter of the proposed amendments, in accordance with its rules of procedure. However, any County Council change to a proposed amendment which substantially changes the general intent or subject matter of the proposed amendment, such as newly adding or deleting a goal, policy, or course of action, or standard, or a map amendment which changes a land use designation of a parcel, shall be considered an entirely new proposed amendment and submitted to the Planning Director and the Windward and Leeward Planning Commissions for their review and recommendations.

(2) Planning Director

- (a) The Planning Director may initiate an interim amendment to the General Plan at any time other than during the comprehensive review.
- (b) The Planning Director shall conduct a workshop on the proposed amendment prior to submitting it to the Windward and Leeward Planning Commissions.
- (c) The Planning Director shall submit the proposed amendment to the Windward and Leeward Planning Commissions for their independent review and separate recommendations.
- (d) The Planning Director shall notify a property owner of a proposed amendment that would redesignate its property to Open or Conservation, unless the property is already designated Conservation by the State Land Use Commission. Notice shall be given not less than 21 days before the first Windward or Leeward Planning Commission hearing on the proposed amendment.
- (e) Each planning commission shall conduct and complete its independent review on the proposed amendments to the General Plan, and shall submit its separate recommendations, within 120 days from the date of receipt of the proposed amendments. If either planning commission fails to act within the required period, it shall be deemed a negative recommendation from that planning commission only. If both planning commissions fail to act on a proposed amendment within the required period, such failure to act shall be deemed a negative recommendation from both planning commissions.
- (f) The County Council may make modifications, deletions, or additions to the proposed amendments as it may deem necessary, within the general intent and subject matter of the proposed amendments, in accordance with its rules of procedure. However, any County Council change to a proposed amendment which substantially changes the general intent or subject matter of the proposed amendment, such as newly adding or deleting a goal, policy, or course of action, or standard, or a map amendment which changes a land use designation of a parcel, shall be considered an entirely new proposed amendment and processed as a new interim amendment pursuant to section 16.2(1).

- (3) General Public
 - (a) Consistent with the County Charter, a member of the public may submit an application requesting the Planning Director to initiate an amendment to the General Plan at any time except during the comprehensive review.
 - (b) The application shall include:
 - (i) A filing fee of \$500.00 to cover the administrative cost of processing the application;
 - (ii) A statement of the nature of the proposed amendment;
 - (iii) A draft of the language of the proposed amendment;
 - (iv) A statement of the reasons for granting the proposed change, supported by a written, documented assessment of the relationships of the proposed change with pertinent elements of the General Plan; and
 - (v) Maps, graphs, plot plan, and other supportive information.
 - (c) Upon receipt of a properly filed and completed application, the Planning Director shall have 120 days to take one of the following actions:
 - (i) Reject the application for an amendment; or
 - (ii) Initiate an amendment to the General Plan.
 - (d) Should the Planning Director initiate an amendment, the amendment shall be processed according to section 16.2(2).
 - (e) In the event that the Planning Director rejects an application for an amendment, the applicant may request the County Council to initiate an amendment on its behalf at any time, except during the comprehensive review. If the County Council decides to initiate the proposed amendment by resolution, the amendment procedure shall follow section 16.2(1).
 - (f) In the event that an application is denied by the County Council, the same or a substantially similar application may not be submitted for consideration within one year following such denial, unless the applicant submits significant new data or additional reasons that the Planning Director may find to be a sufficient basis for the application to be considered.

16.3 RULES AND REGULATIONS. The Planning Director and the Windward and Leeward Planning Commissions are authorized to promulgate rules and regulations to implement the amendment procedures. Any such rule or regulation shall be established by the Windward and Leeward Planning Commissions acting jointly.



OVERALL INDEX MAP

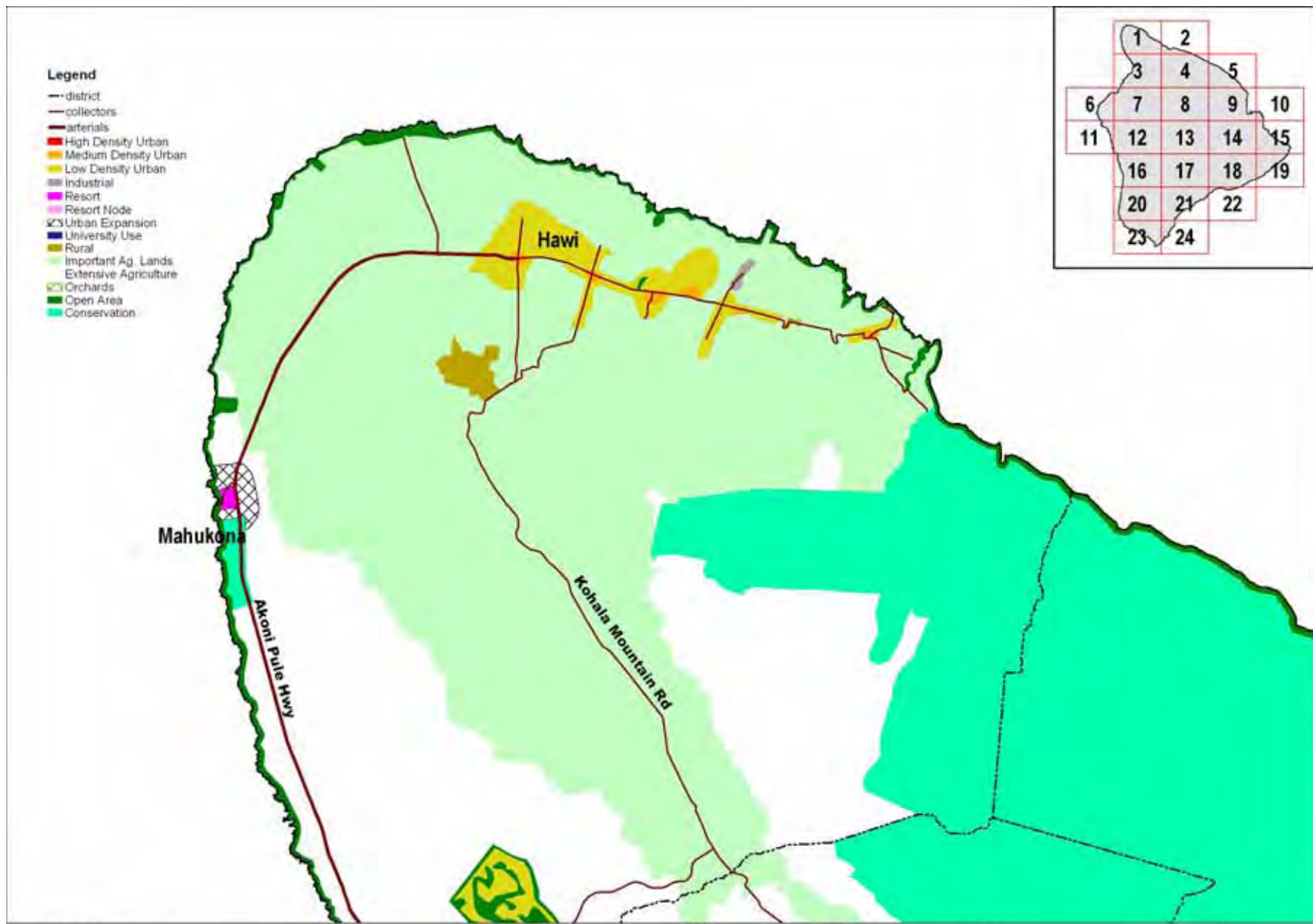


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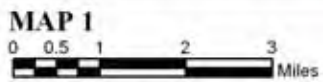
**LAND USE PATTERN ALLOCATION GUIDE MAP
COUNTY OF HAWAII
GENERAL PLAN**



Figure 1. Index Islandwide Map



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Revised 4/16/07 (Amd. Oct. 06-153)

LAND USE PATTERN ALLOCATION GUIDE MAP
COUNTY OF HAWAII
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Figure 2. Map 1

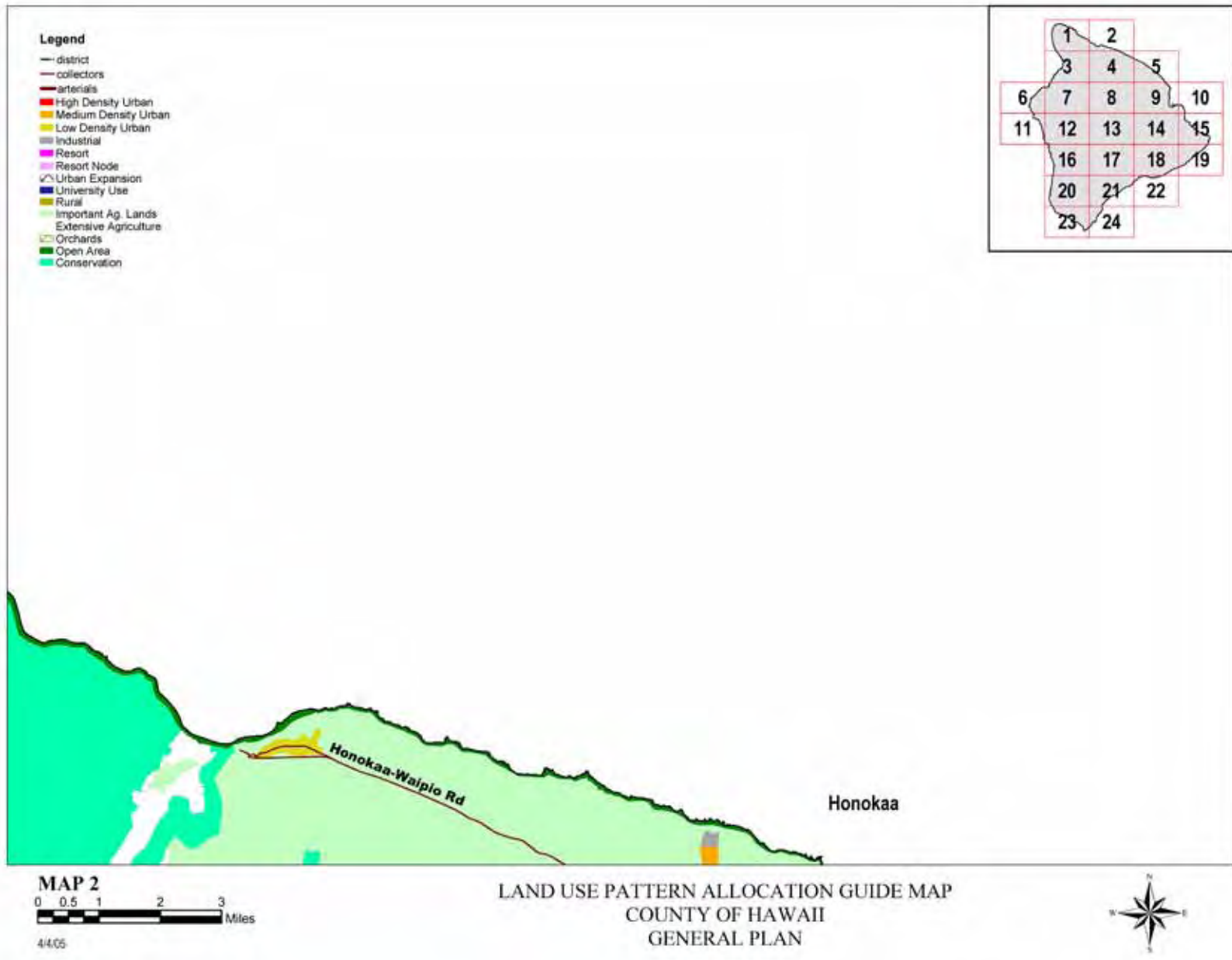


Figure 3. Map 2

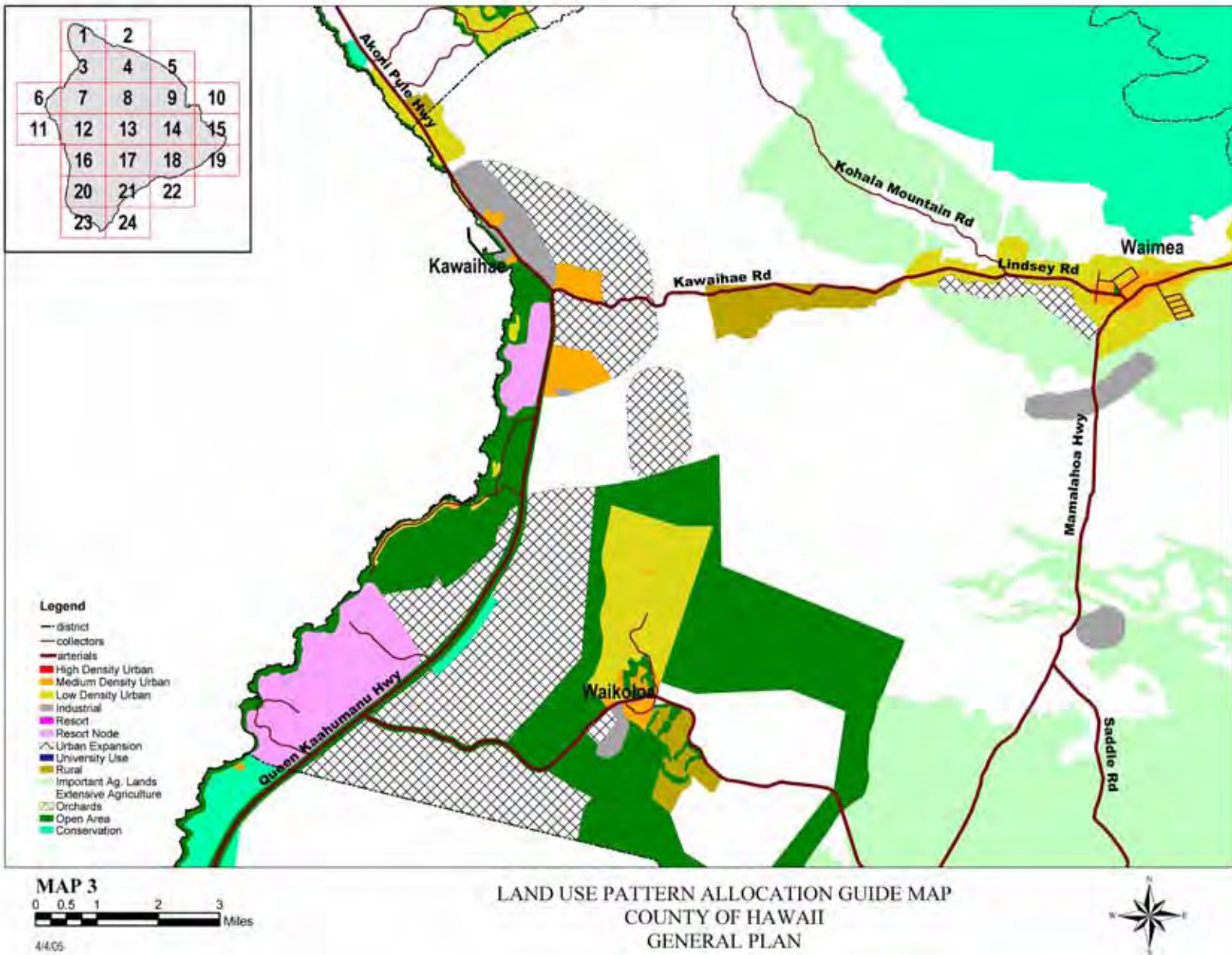
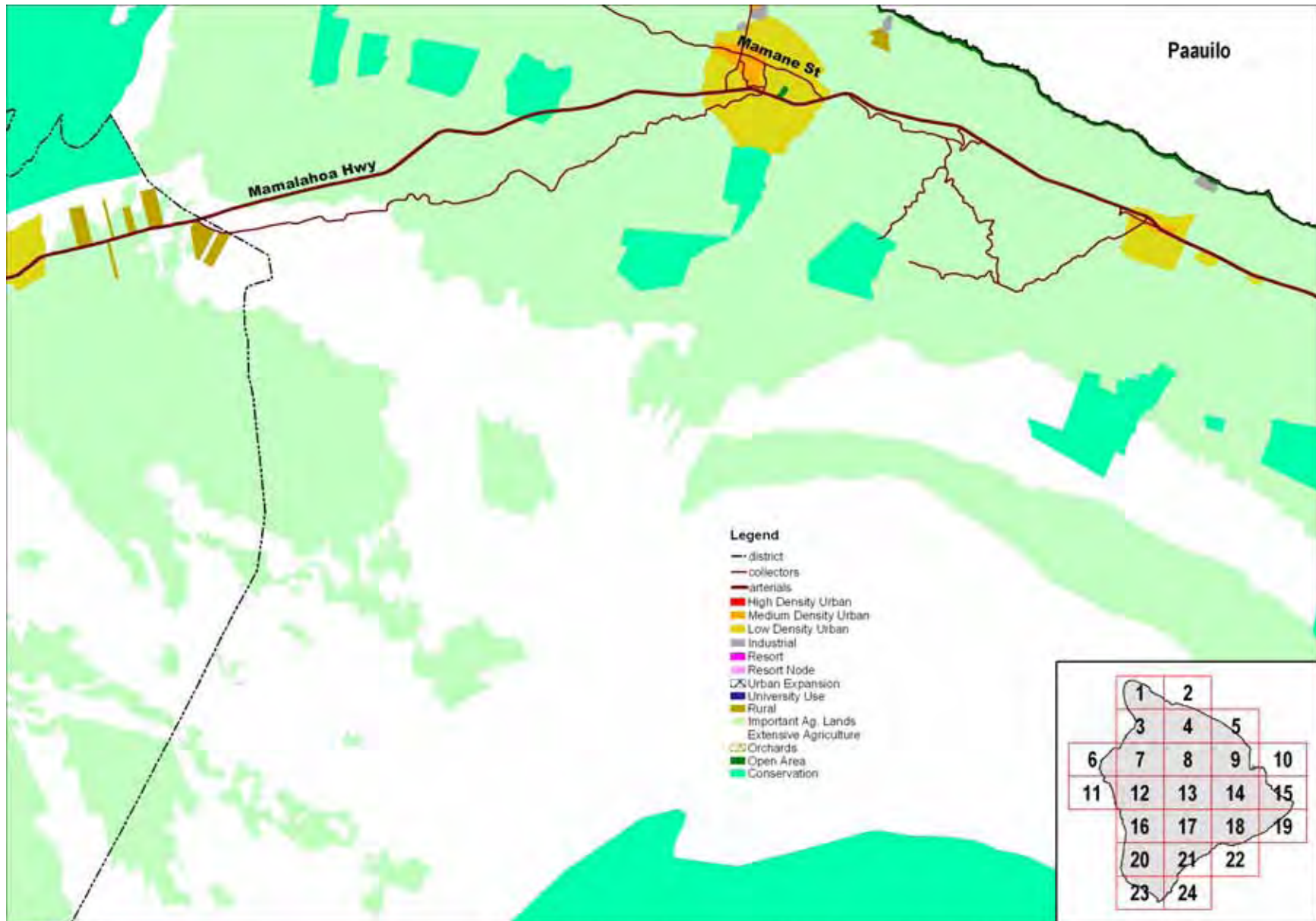


Figure 4. Map 3



MAP 4
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LAND USE PATTERN ALLOCATION GUIDE MAP
 COUNTY OF HAWAII
 GENERAL PLAN



Figure 5. Map 4

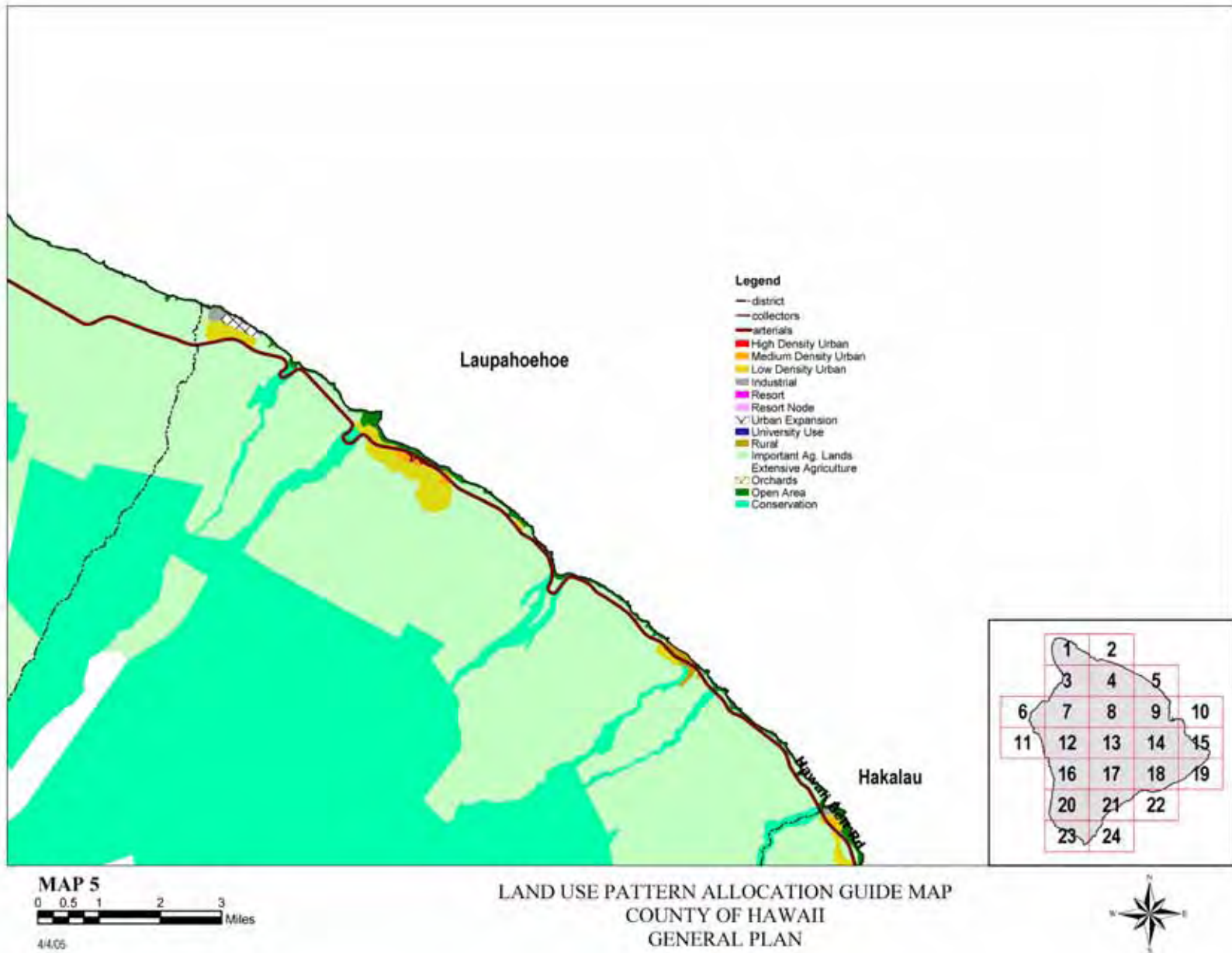


Figure 6. Map 5

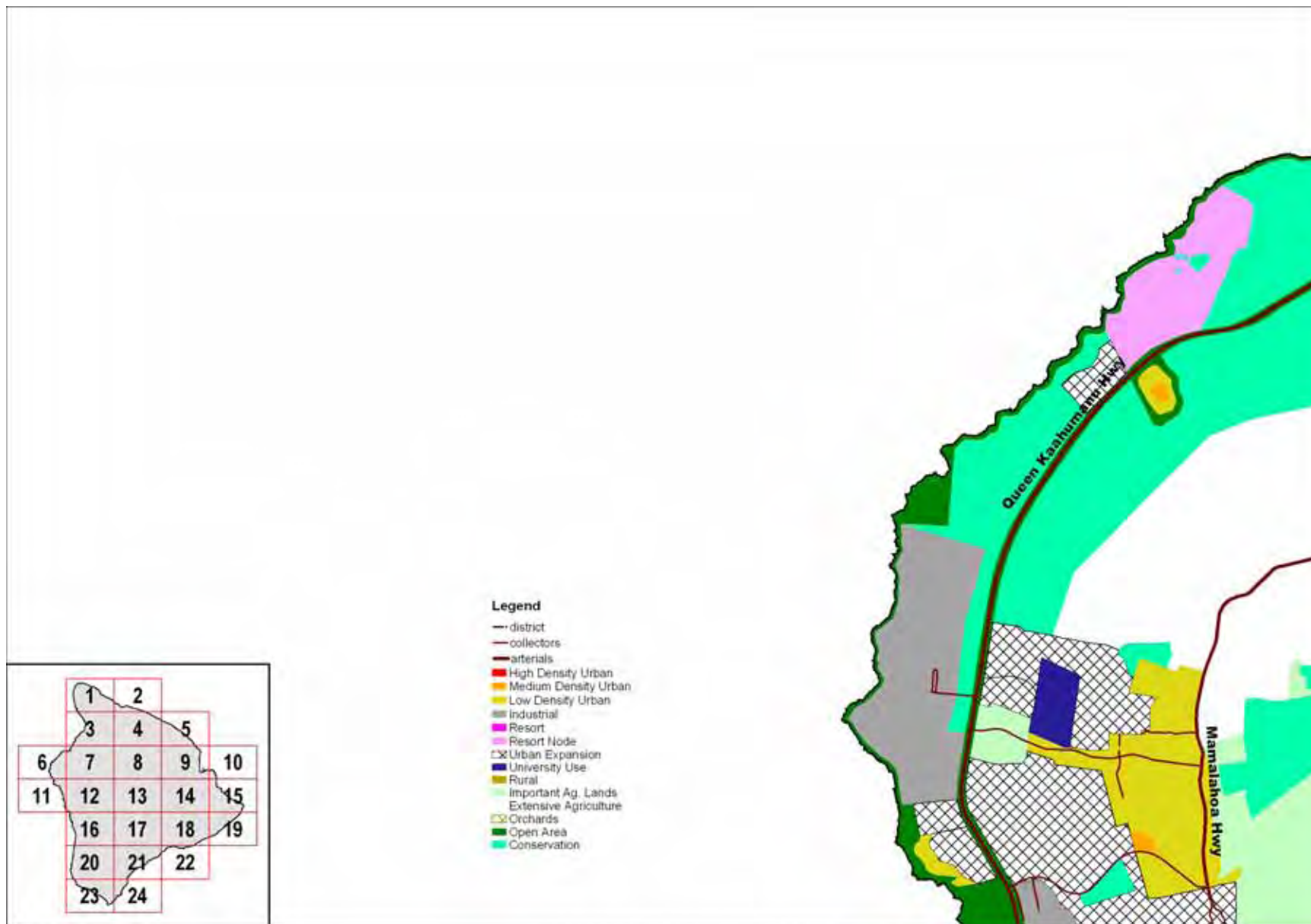


Figure 7. Map 6

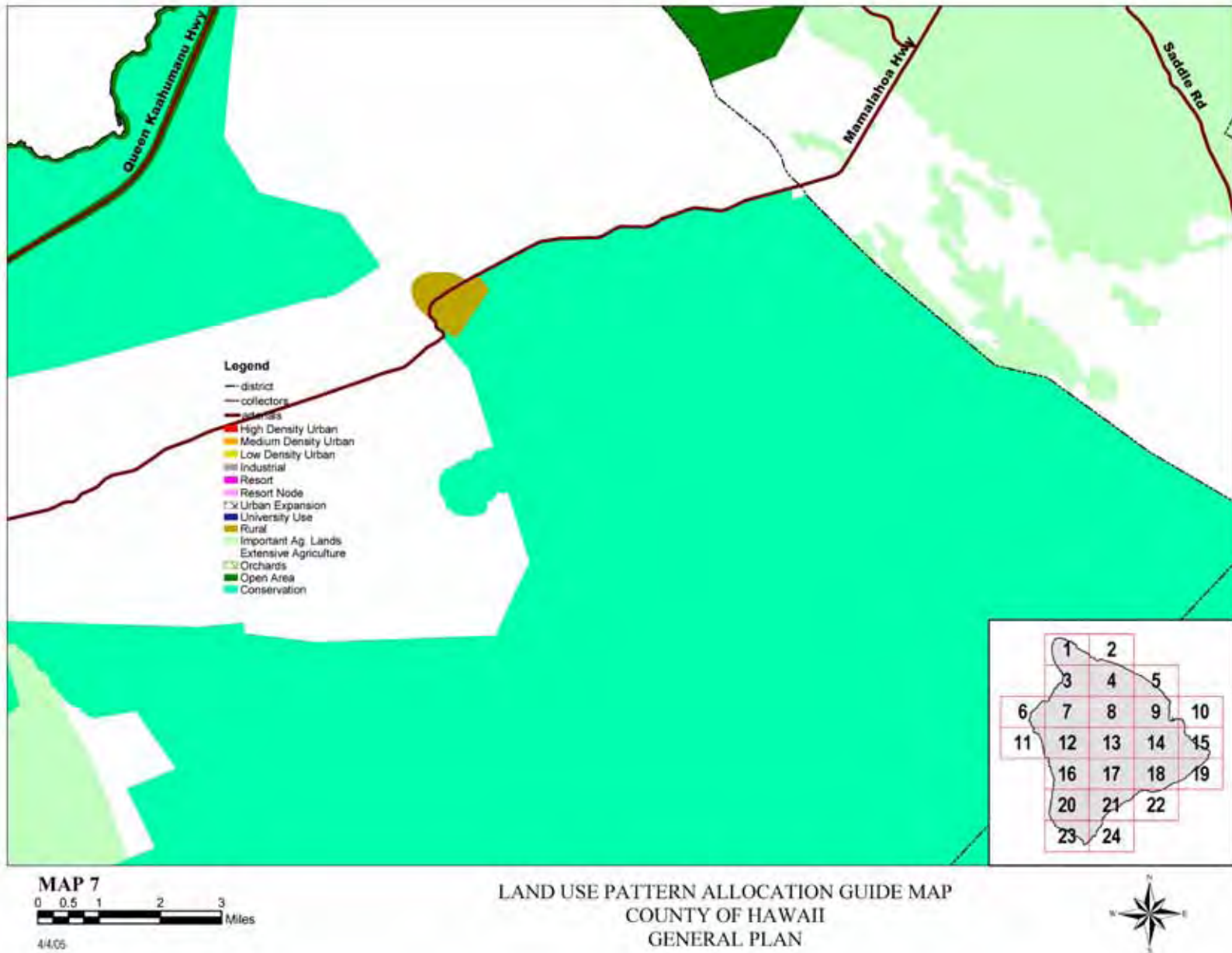


Figure 8. Map 7

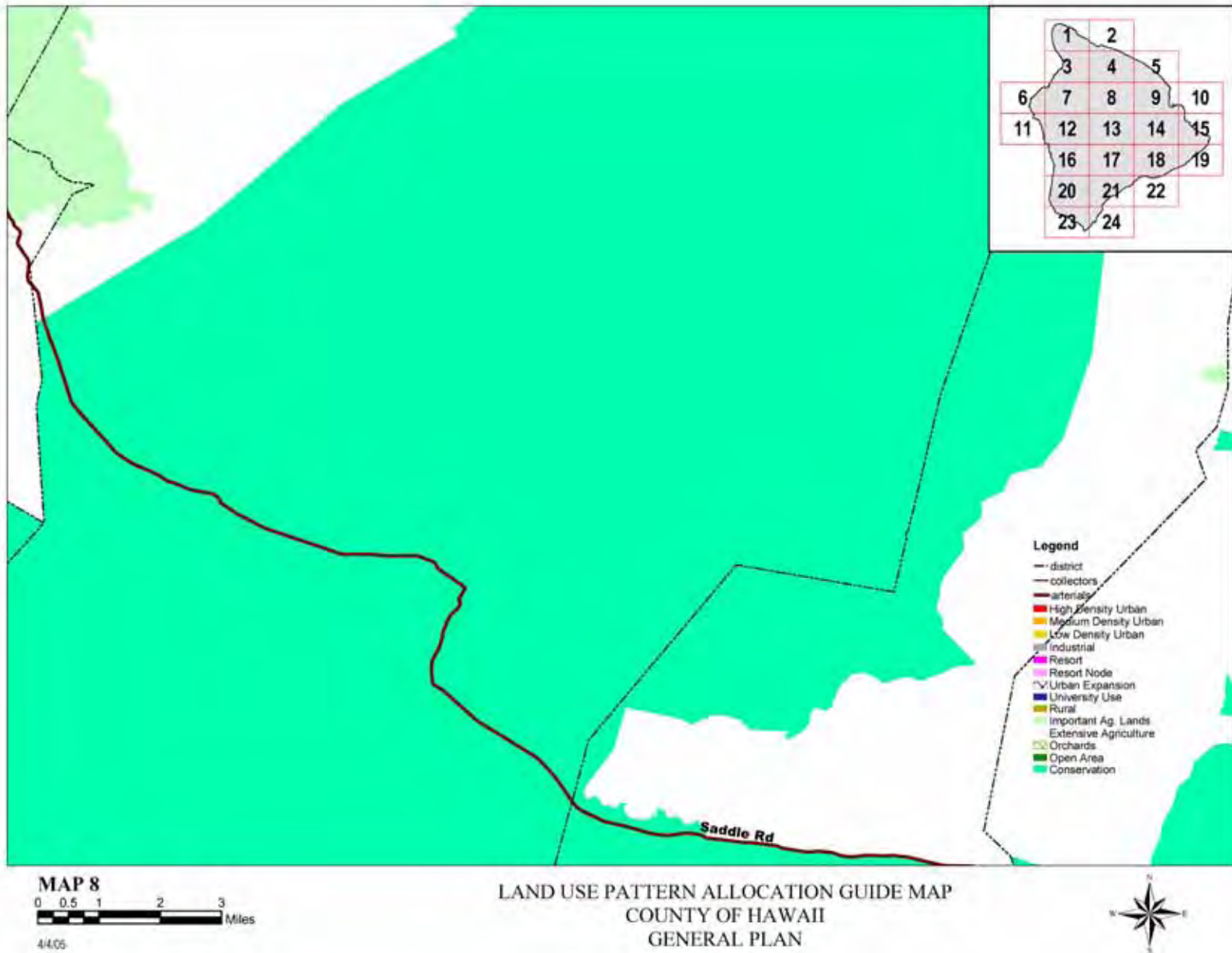
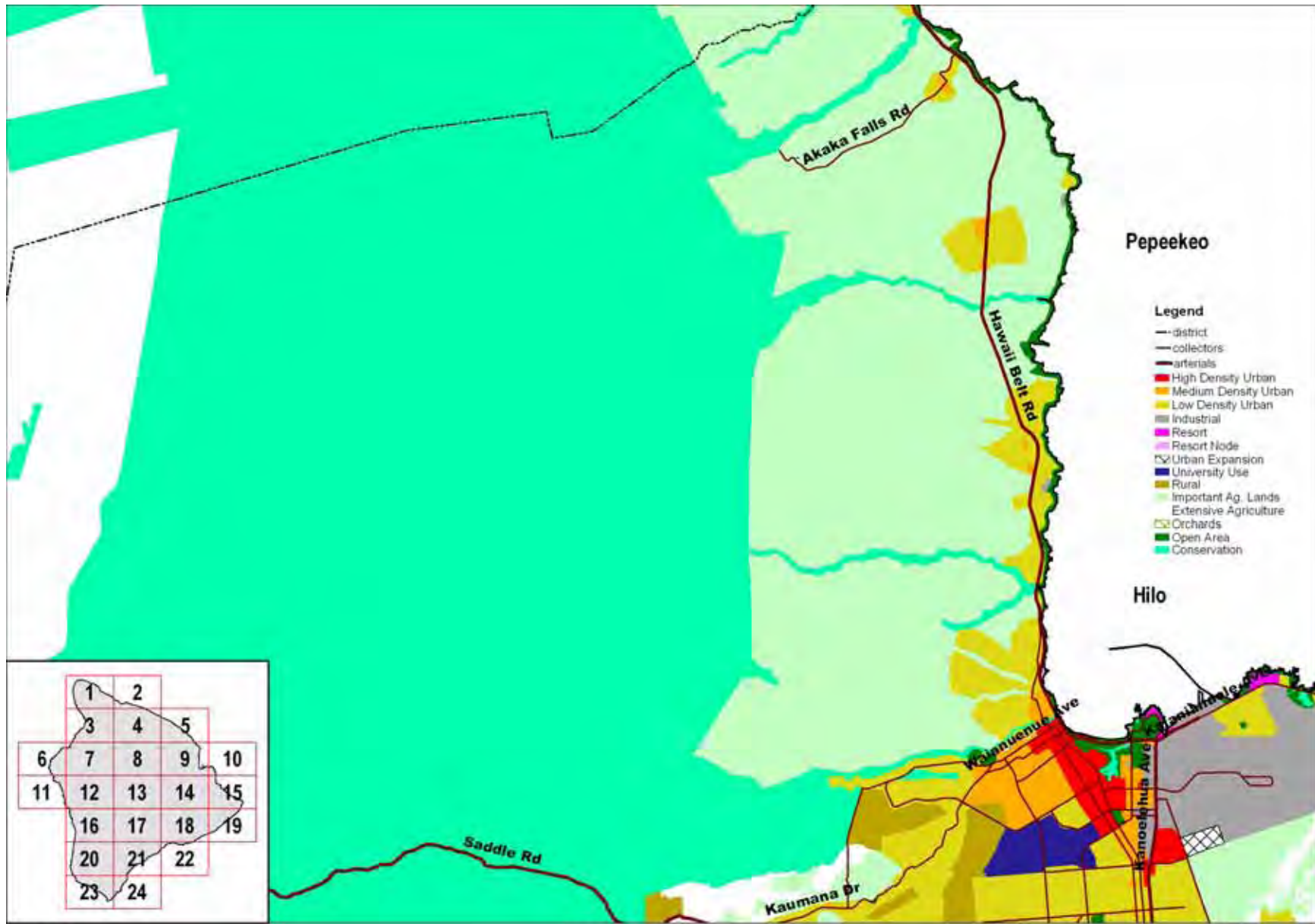


Figure 9. Map 8



MAP 9
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 Revised 4/16/07 (Amd. Oct. 06-153)

LAND USE PATTERN ALLOCATION GUIDE MAP
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Figure 10. Map 9

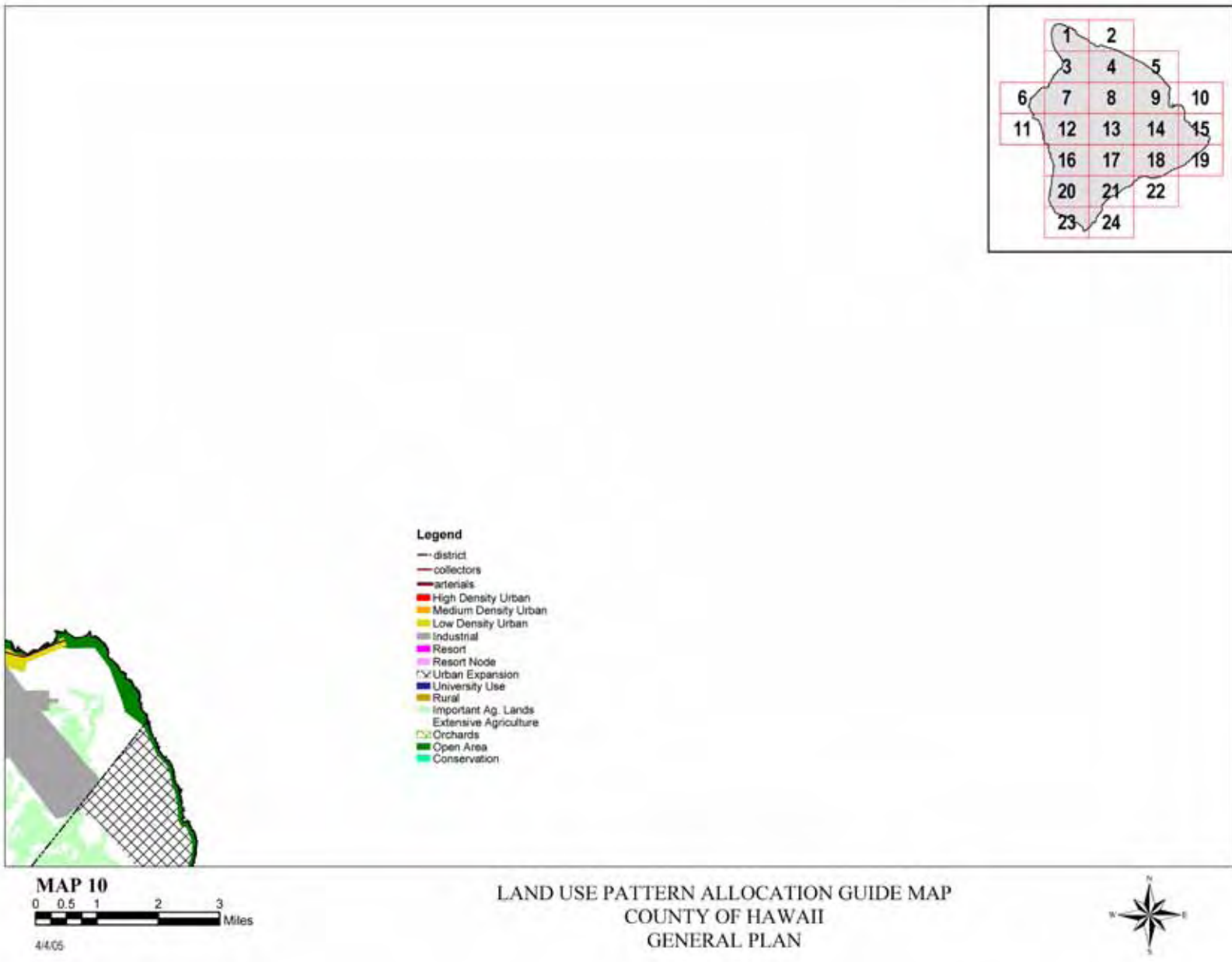
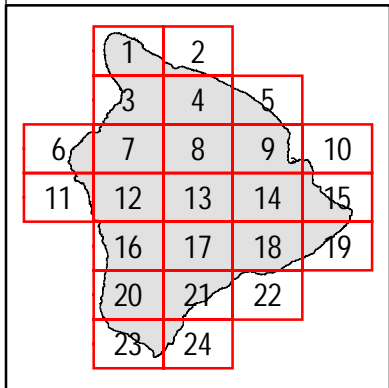
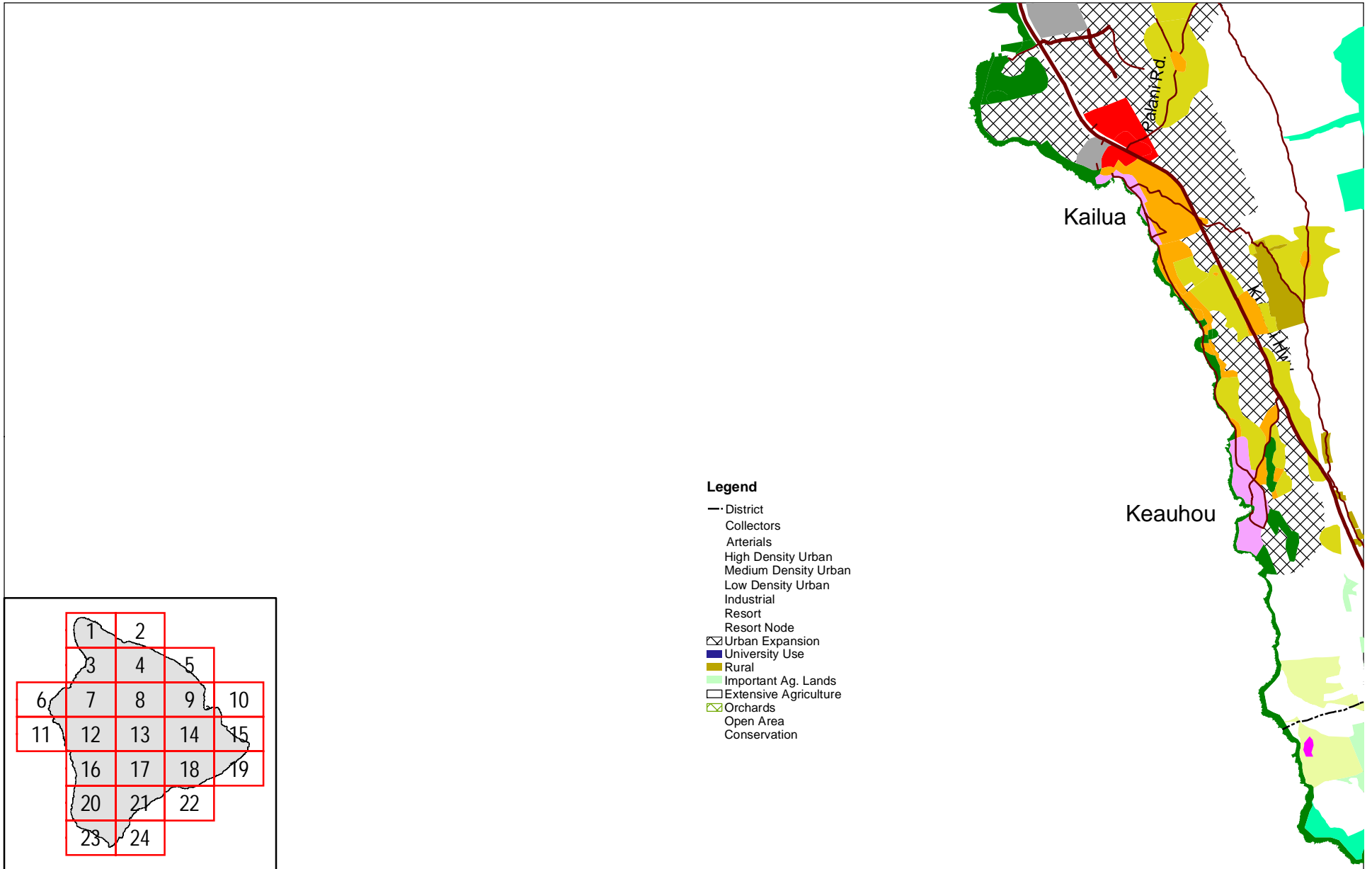


Figure 11. Map 10



MAP 11
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 Revised 12/3/09 (Ord. 09-150)

LAND USE PATTERN ALLOCATION GUIDE MAP
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Figure 12. Map 11

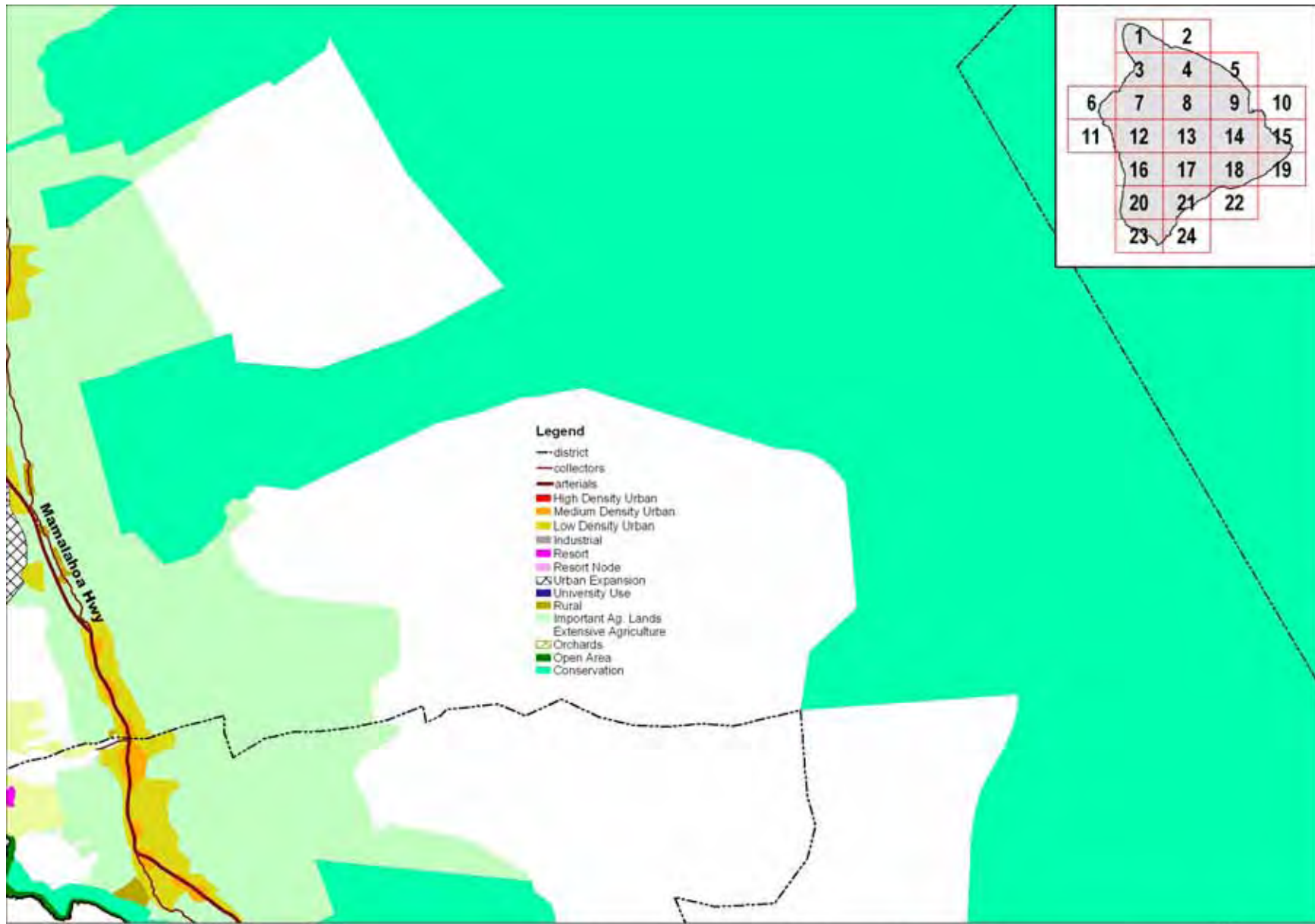


Figure 13. Map 12

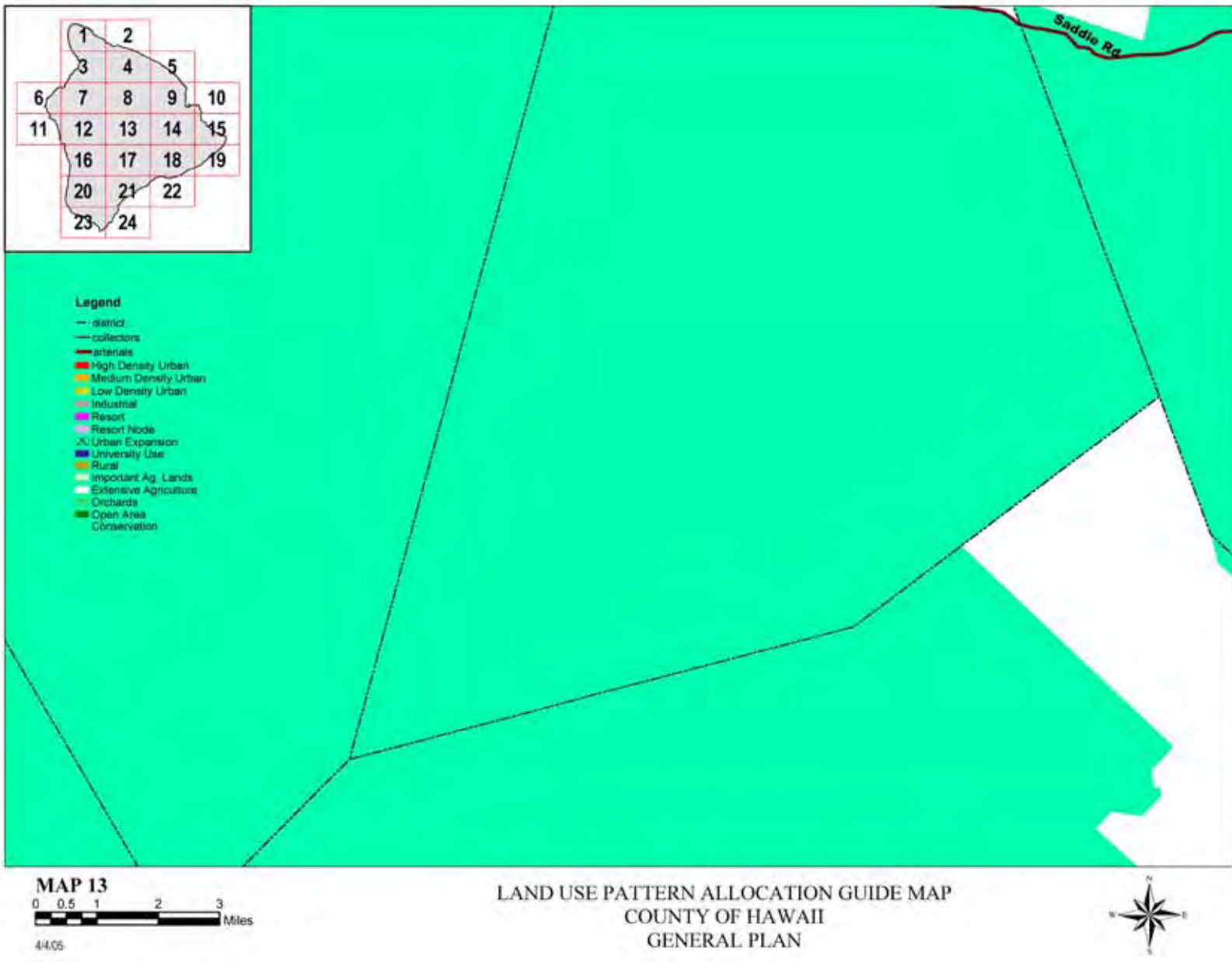
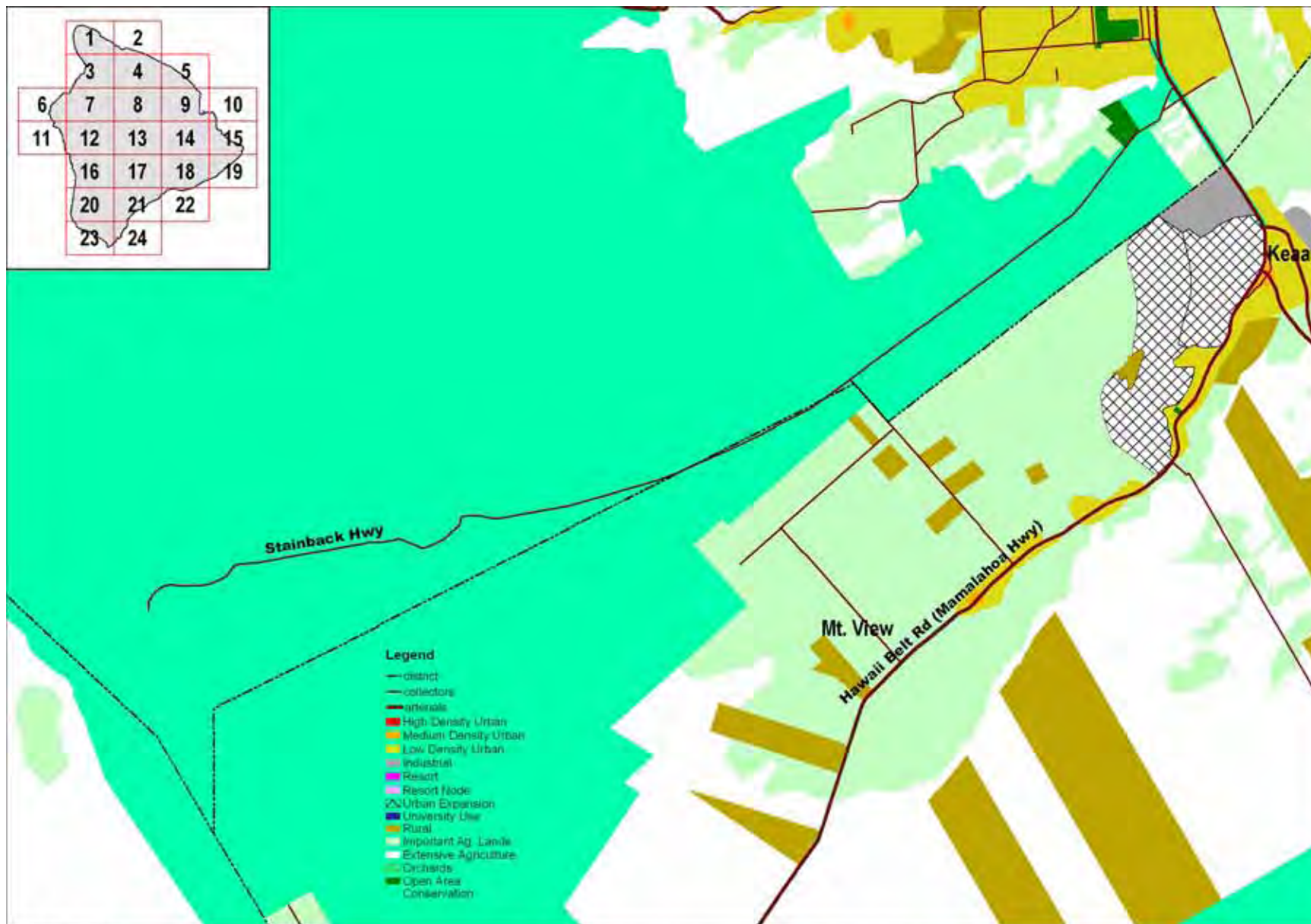


Figure 14. Map 13



MAP 14

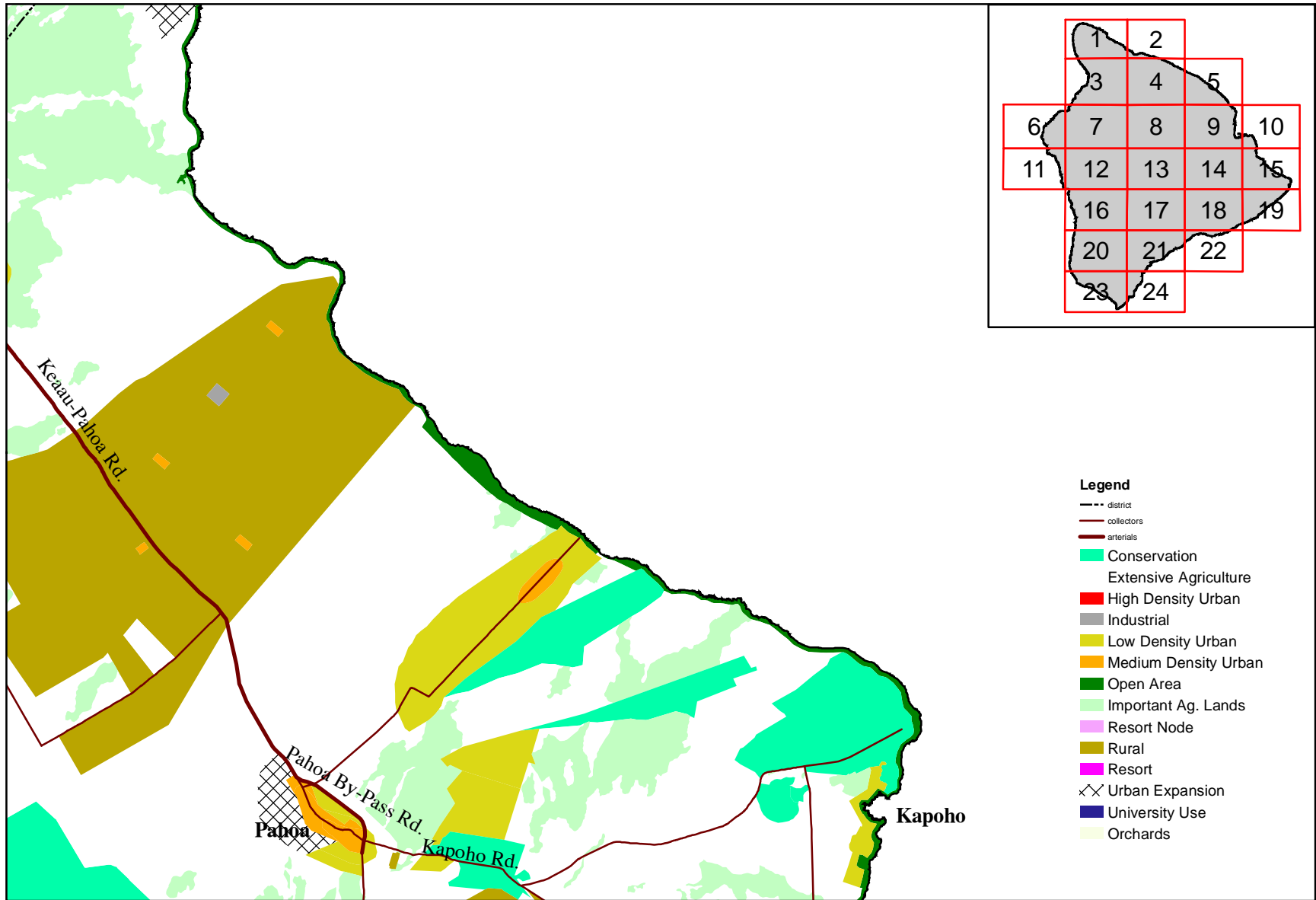
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Revised 4/16/07 (Amd. Oct. 06-153)

LAND USE PATTERN ALLOCATION GUIDE MAP
COUNTY OF HAWAII
GENERAL PLAN



Figure 15. Map 14



MAP 15



Revised 12/27/12 (Ord. 12-89)

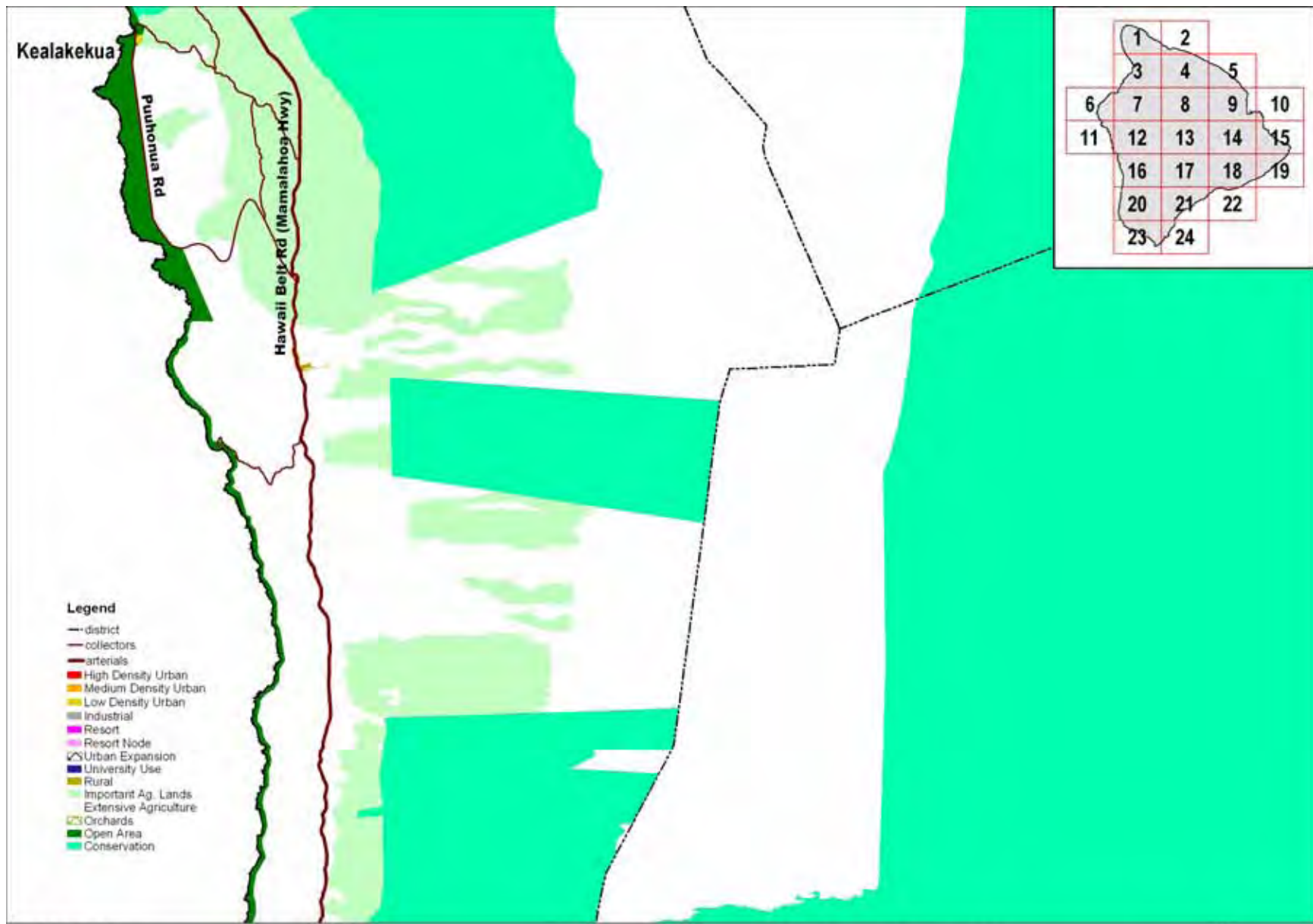
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LAND USE PATTERN ALLOCATION GUIDE MAP
 COUNTY OF HAWAII
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SUPP. 1 (Ord. No. 12-89)

Figure 16. Map 15



MAP 16
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**LAND USE PATTERN ALLOCATION GUIDE MAP
 COUNTY OF HAWAII
 GENERAL PLAN**



Figure 17. Map 16

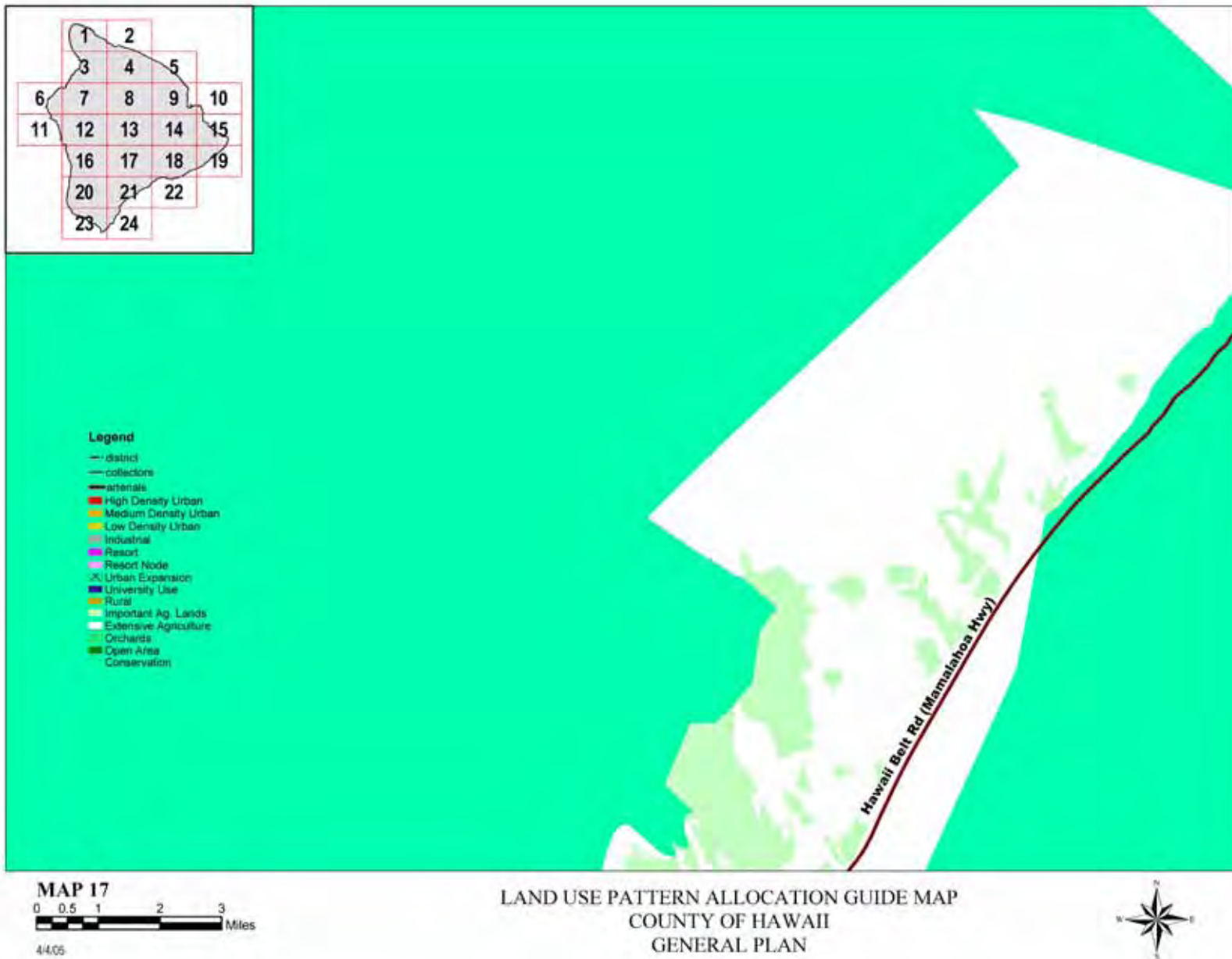


Figure 18. Map 17

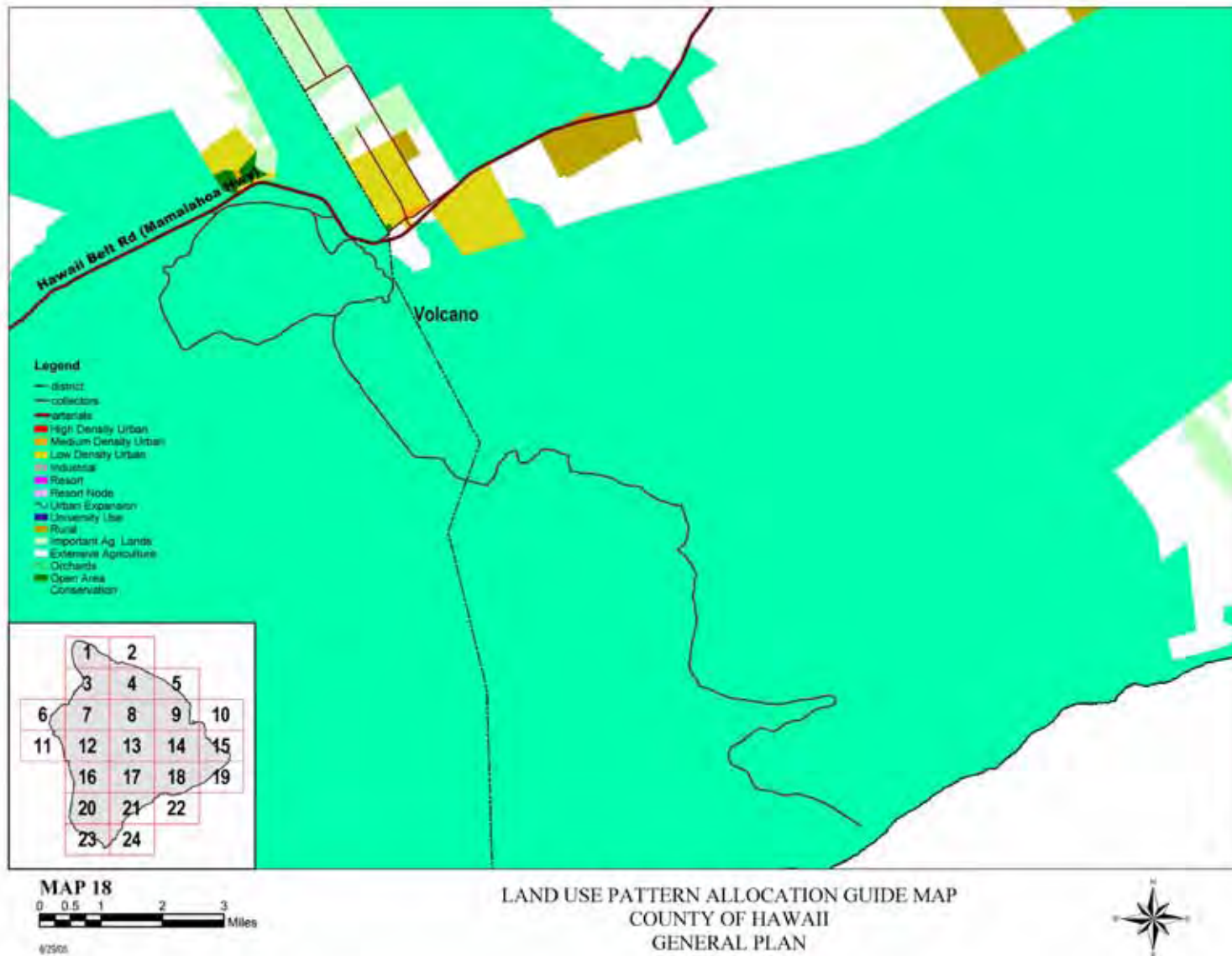


Figure 19. Map 18

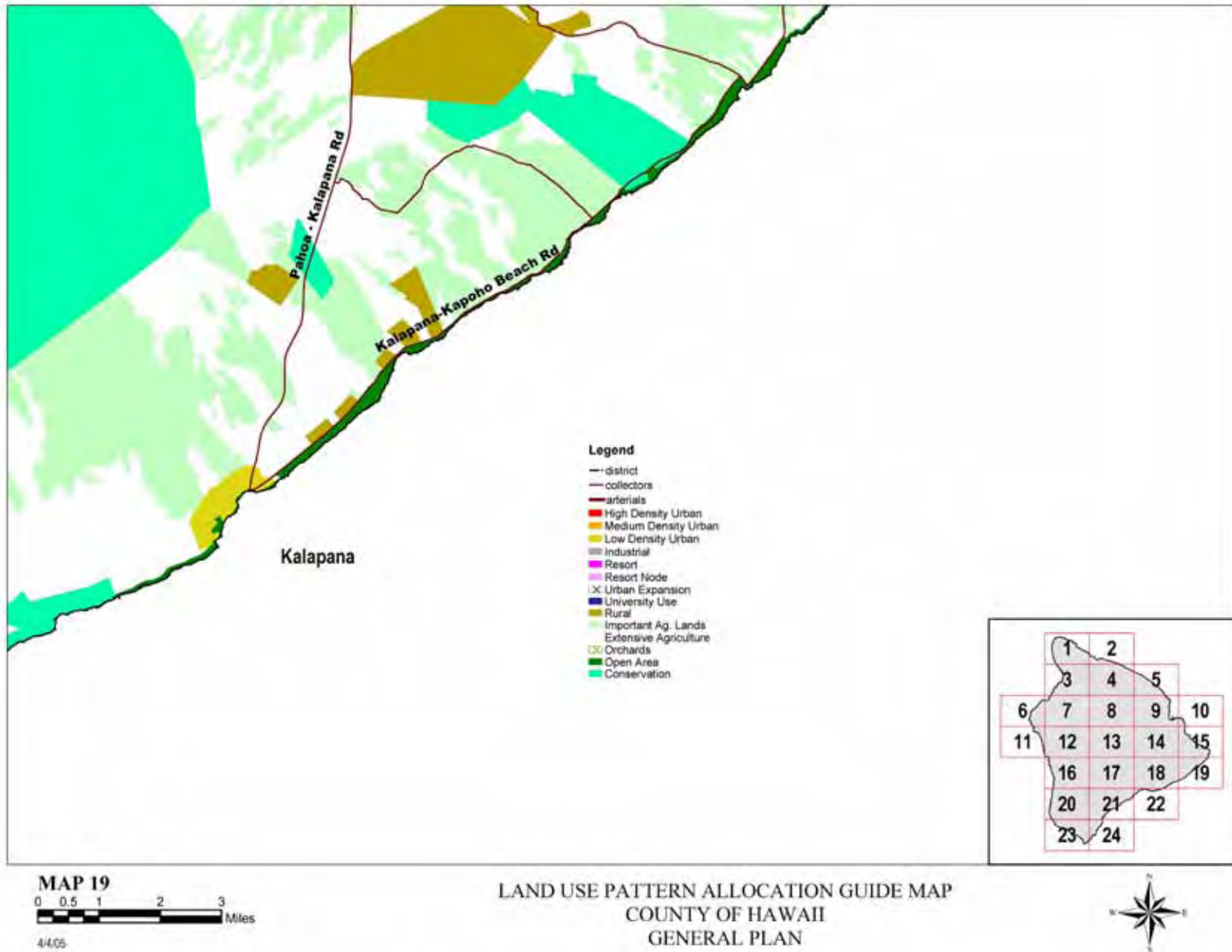


Figure 20. Map 19



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MAP 20
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Figure 21. Map 20

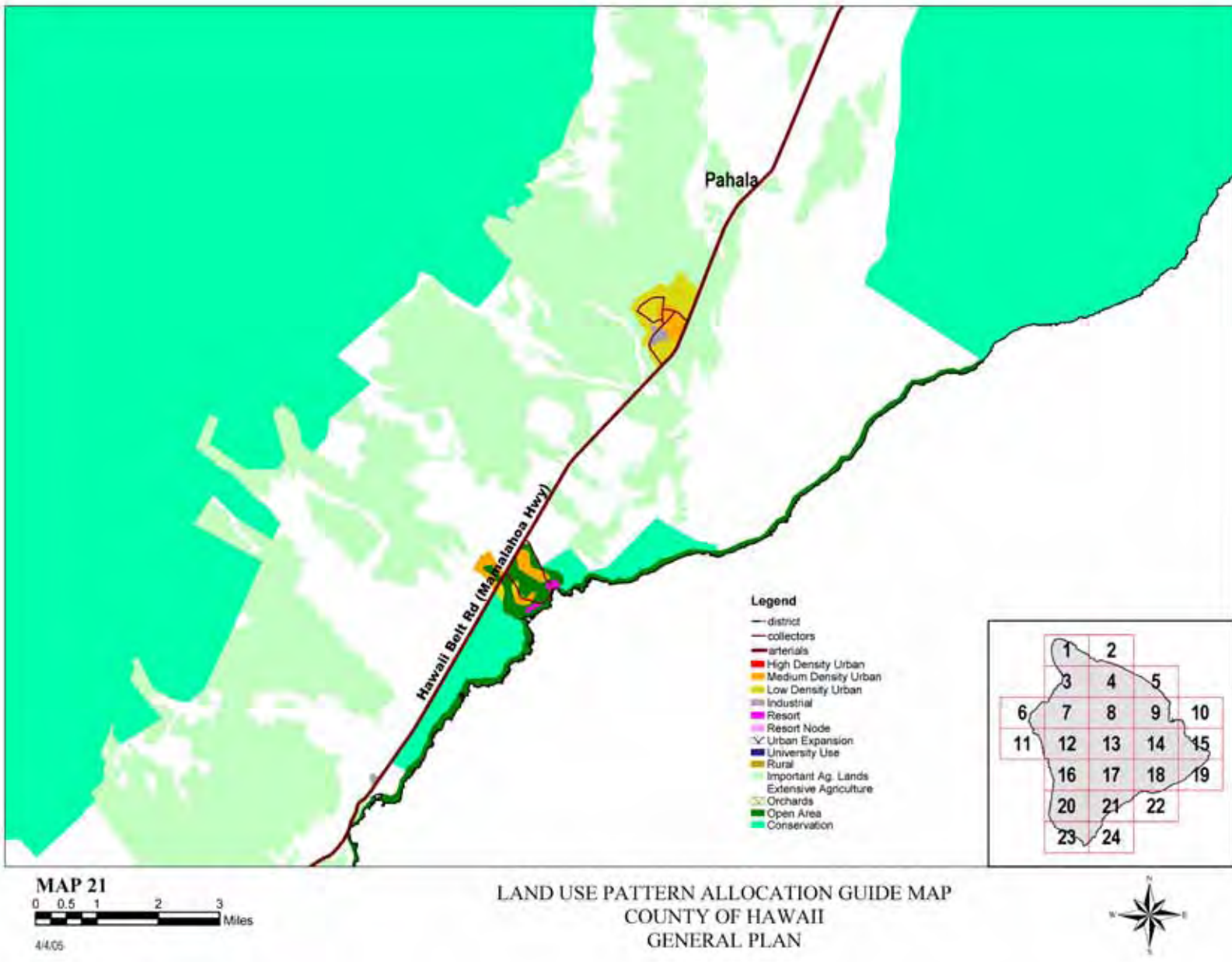


Figure 22. Map 21

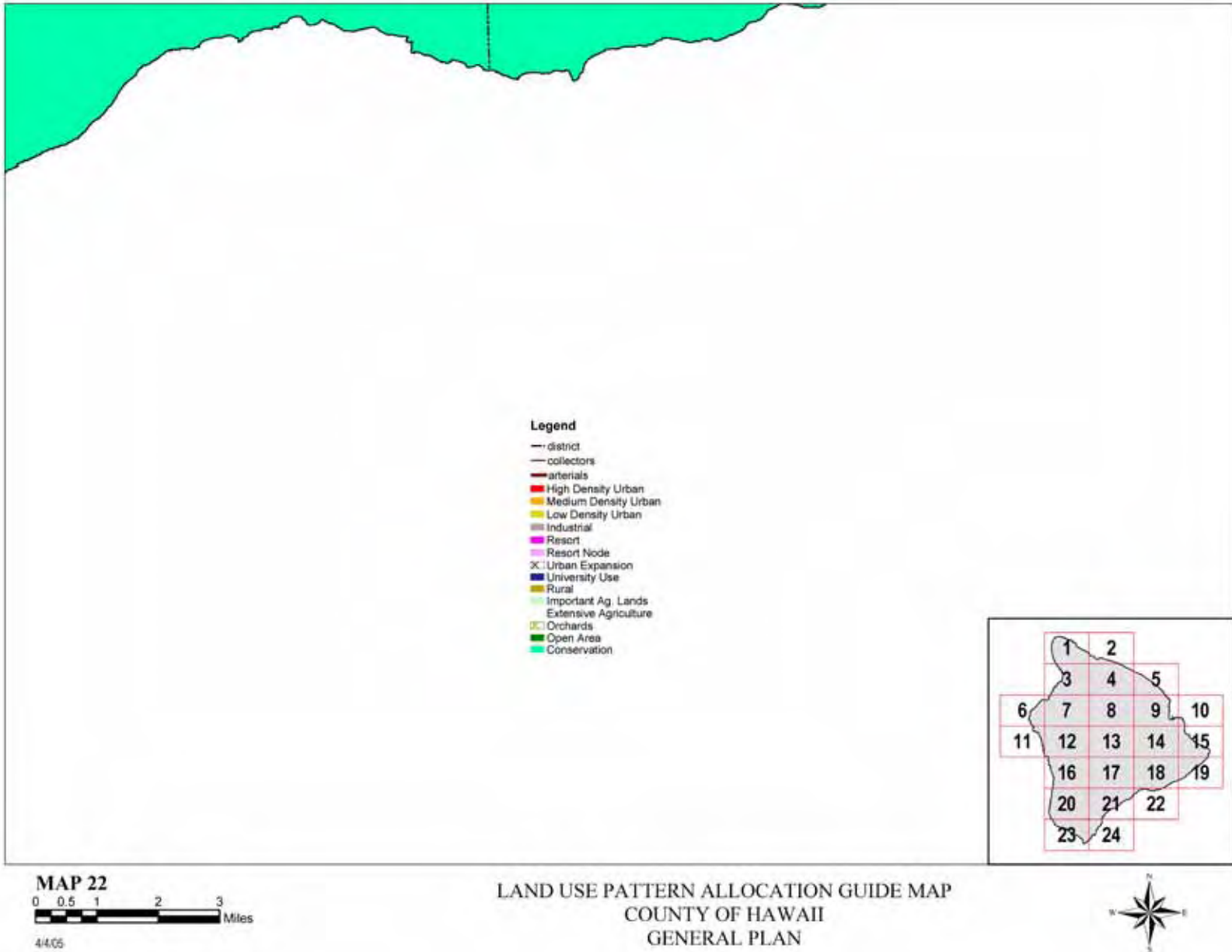
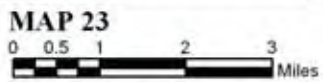
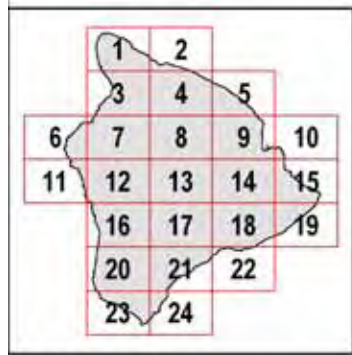
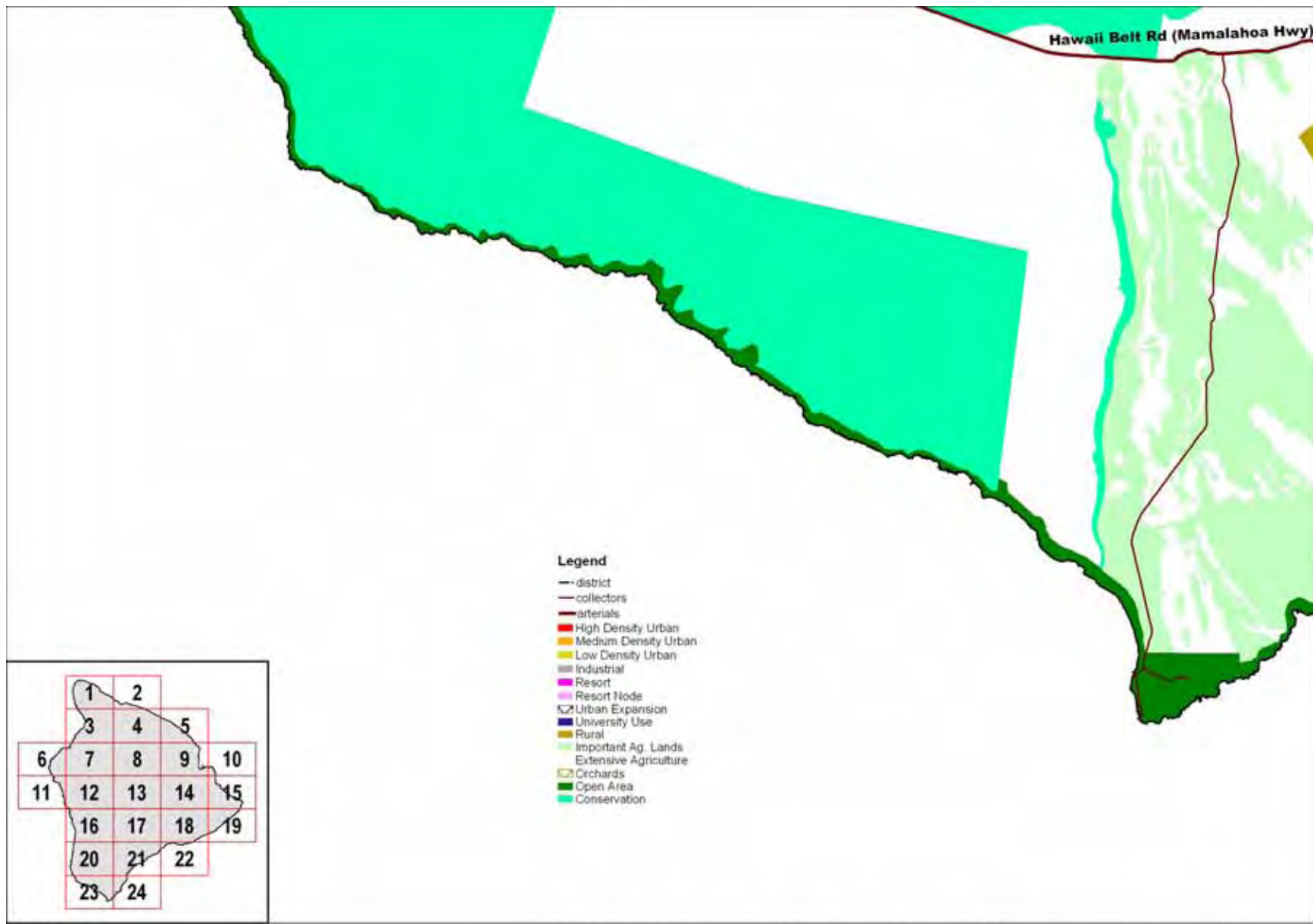


Figure 23. Map 22



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Figure 24. Map 23

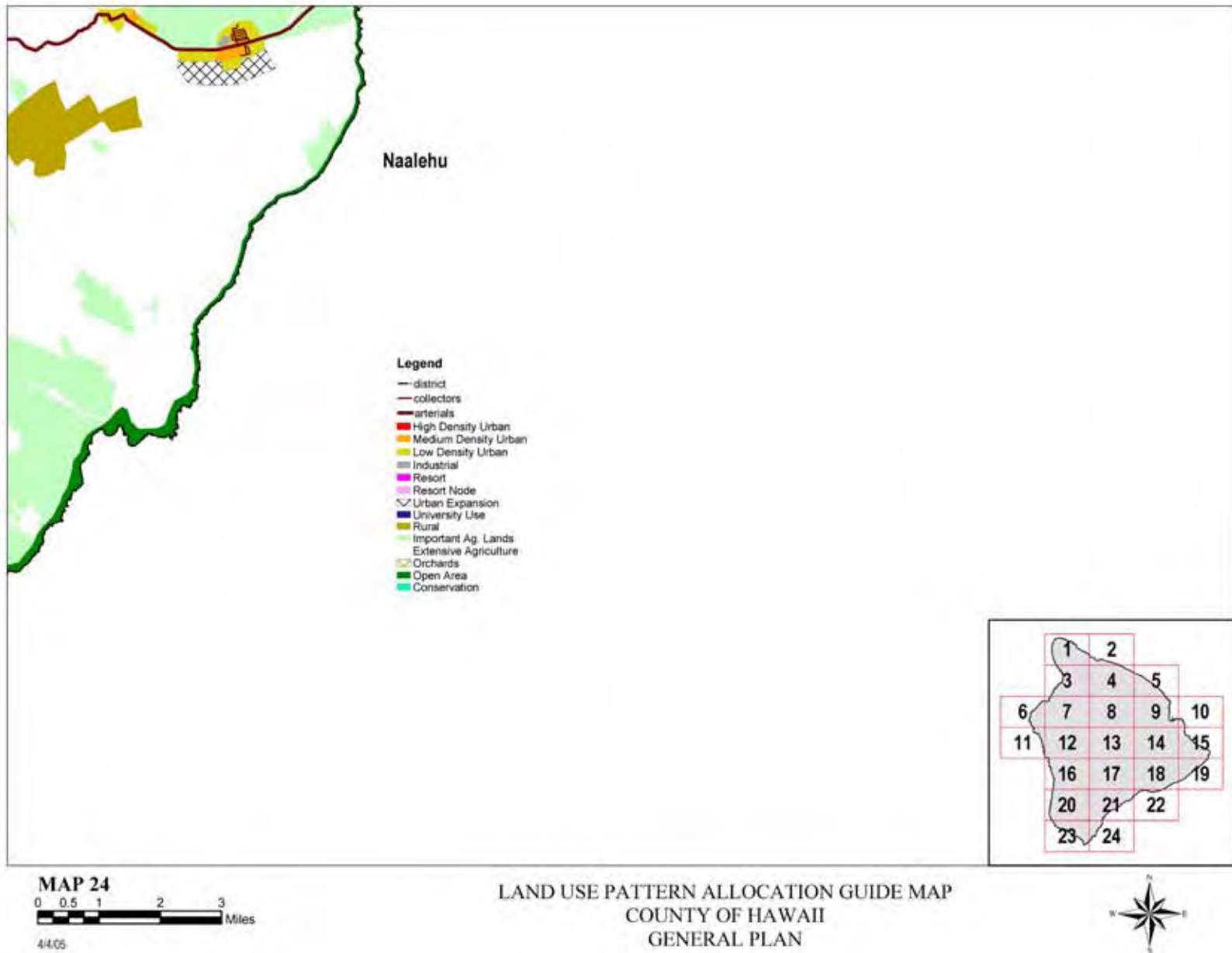
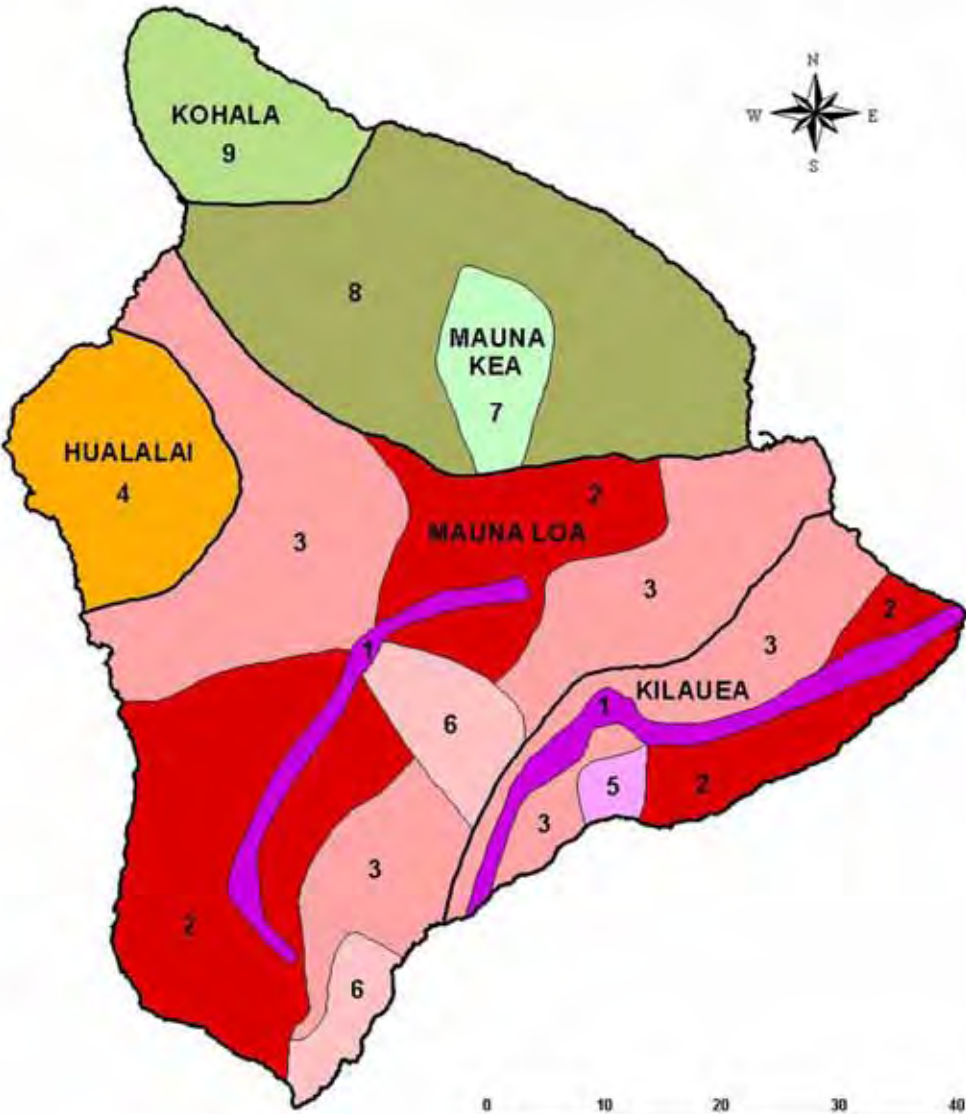


Figure 25. Map 24

LAVA HAZARD ZONE

Note: This map was produced by the County of Hawaii, Planning Department. It is intended for planning purposes only and should not be used for boundary interpretations or other spatial analysis beyond the limitations of the data.

Sources :
U.S. Department of Interior / Geological Survey
State of Hawaii, Office of Planning
(Website address: www.state.hi.us/dbedt/gis)



LEGEND

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(The Island of Hawaii is divided into zones according to the degree of hazard from lava flows: Zone 1 is the area of the greatest hazard, Zone 9 of the least.)

"Hazard zone boundaries are approximate and gradational. These boundaries are not specific enough to determine the absolute degree of danger at any particular site. Lava flow hazard maps are designed to show relative hazard across the Island of Hawaii and are meant to be used for general planning purposes only."

(U.S. Dept. of the Interior/Geological Survey and the State of Hawaii, Office of Planning)

Figure 26. Lava Hazard Zones

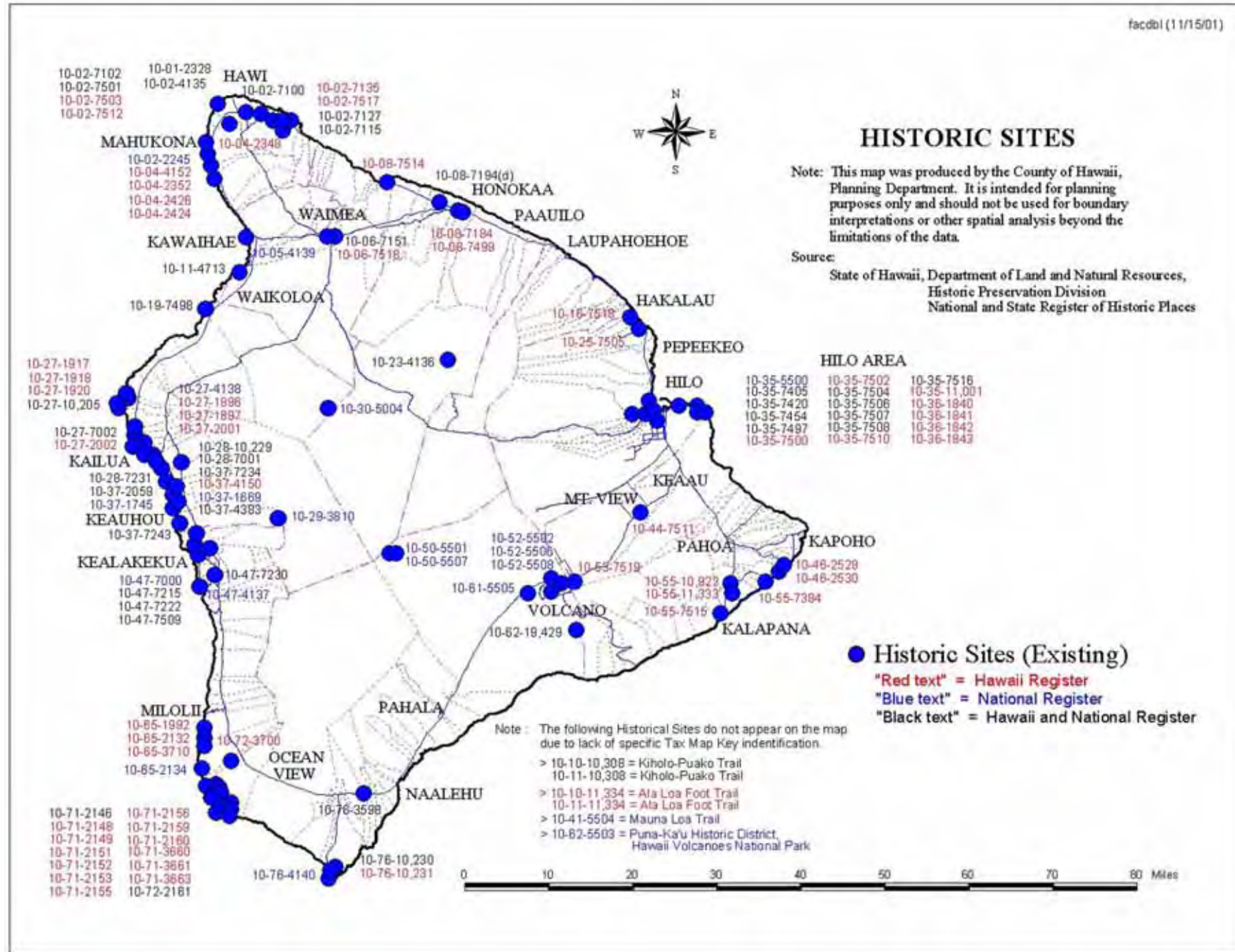


Figure 27. Historic Sites

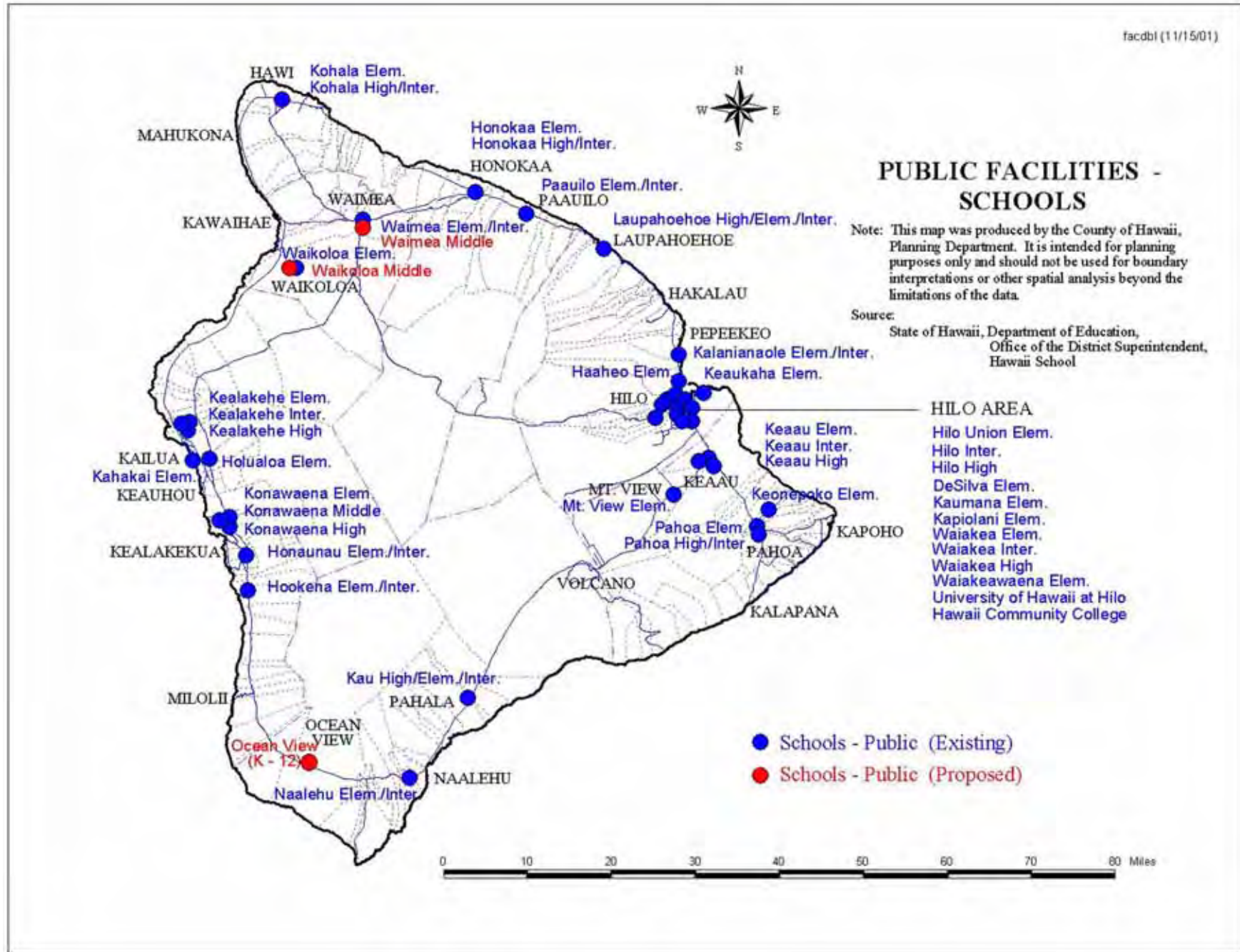


Figure 28. Public Facilities - Schools

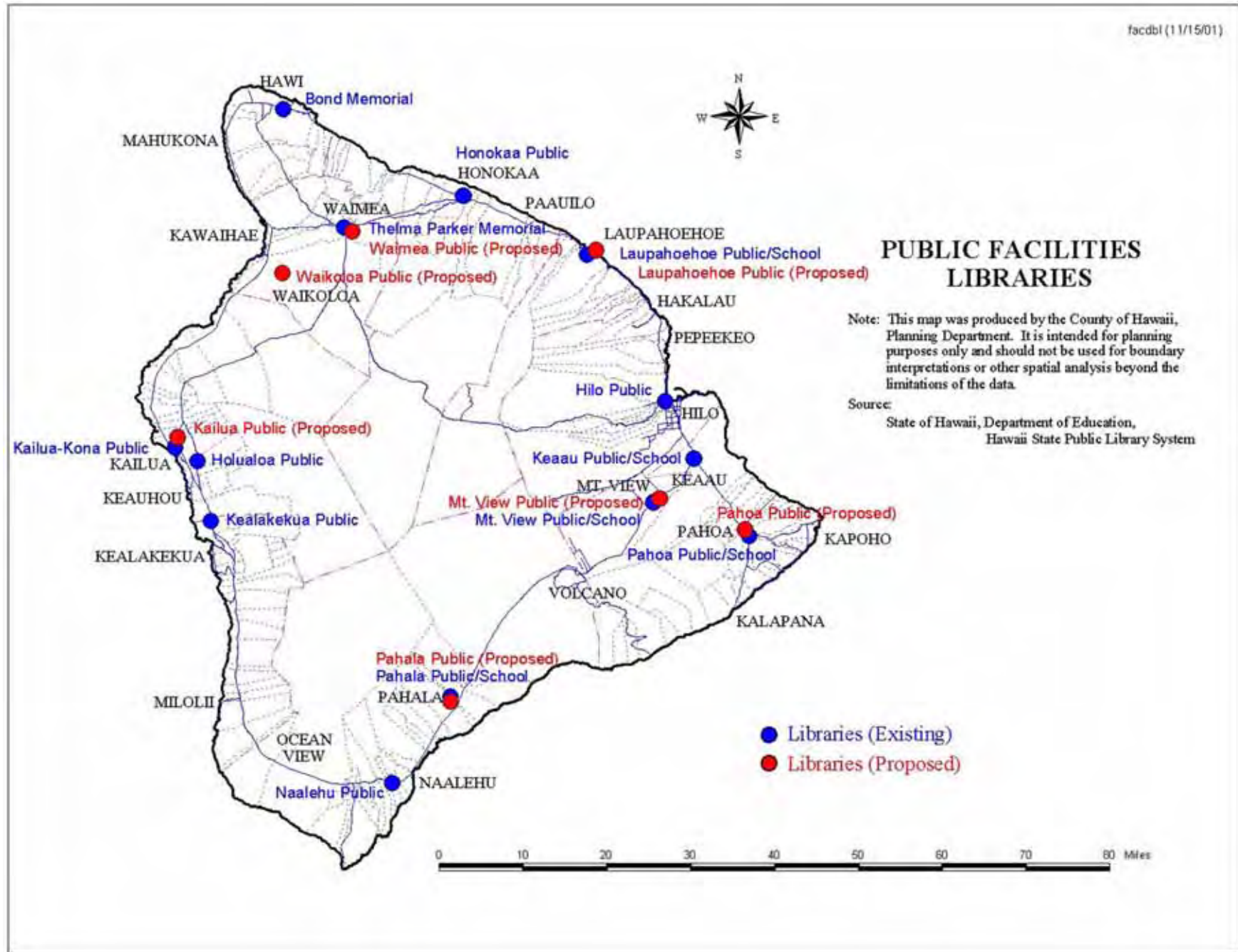


Figure 29. Public Facilities - Libraries

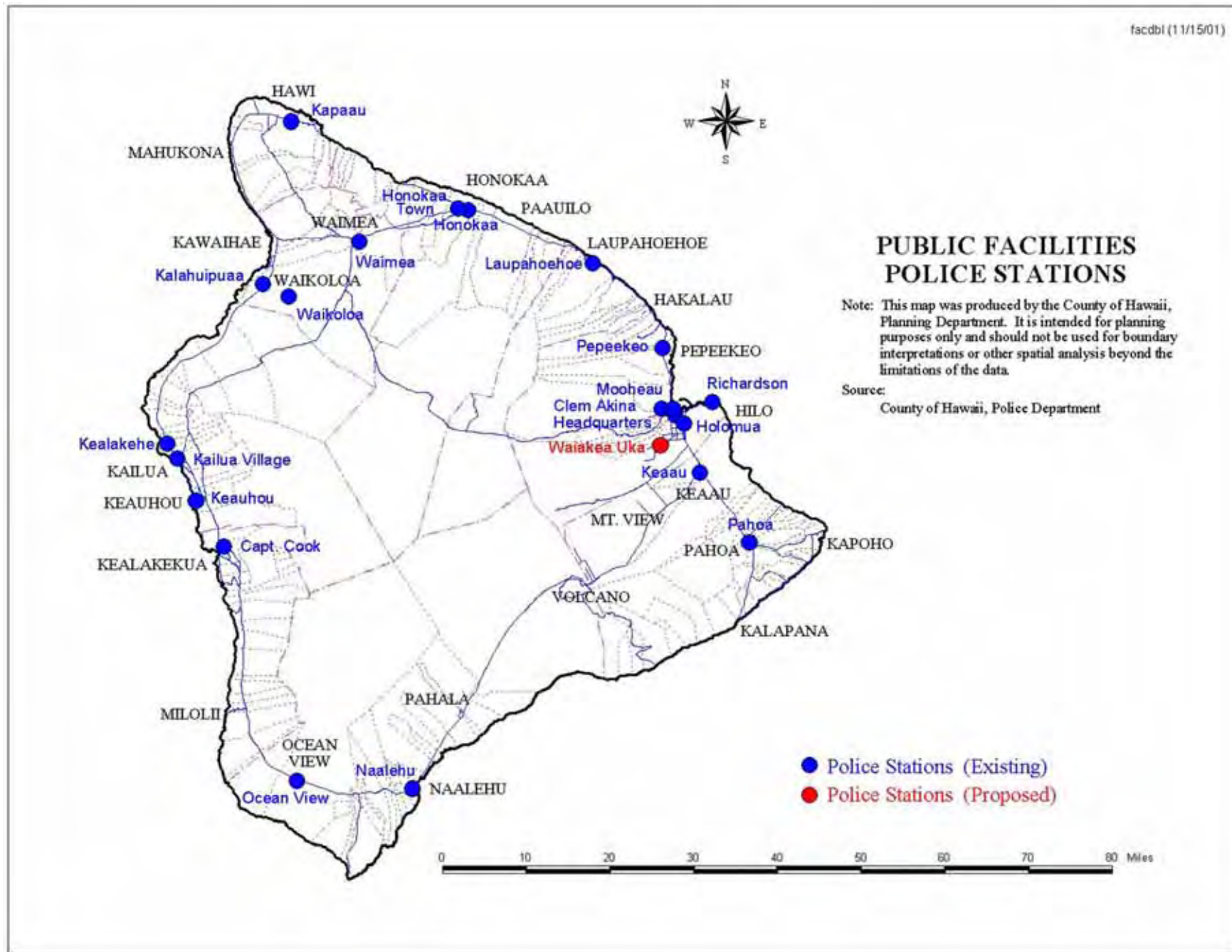


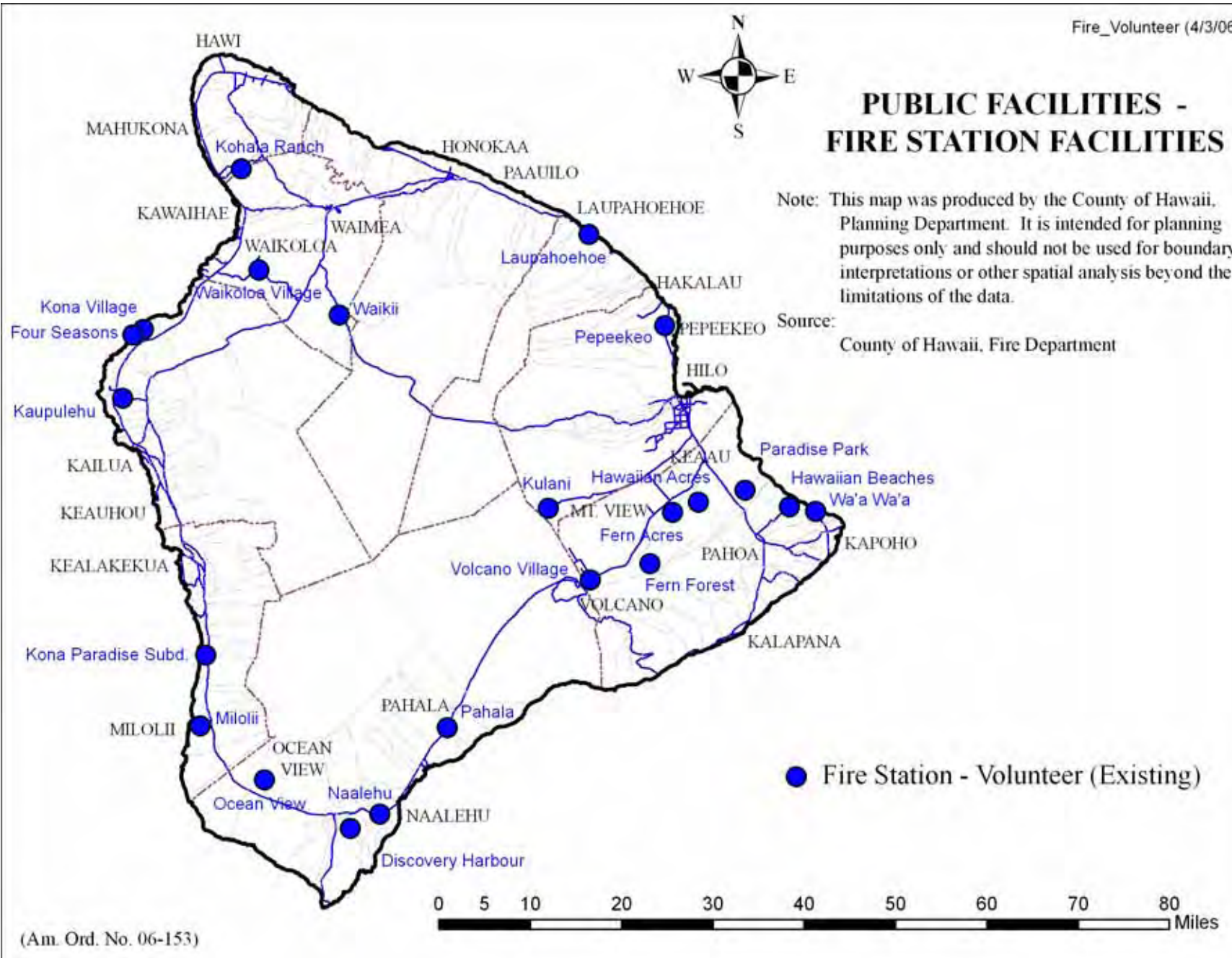
Figure 30. Police Stations

PUBLIC FACILITIES - FIRE STATION FACILITIES



Note: This map was produced by the County of Hawaii, Planning Department. It is intended for planning purposes only and should not be used for boundary interpretations or other spatial analysis beyond the limitations of the data.

Source: County of Hawaii, Fire Department



(Am. Ord. No. 06-153)

Figure 32. Public Facilities - Fire Station Facilities (Volunteer)

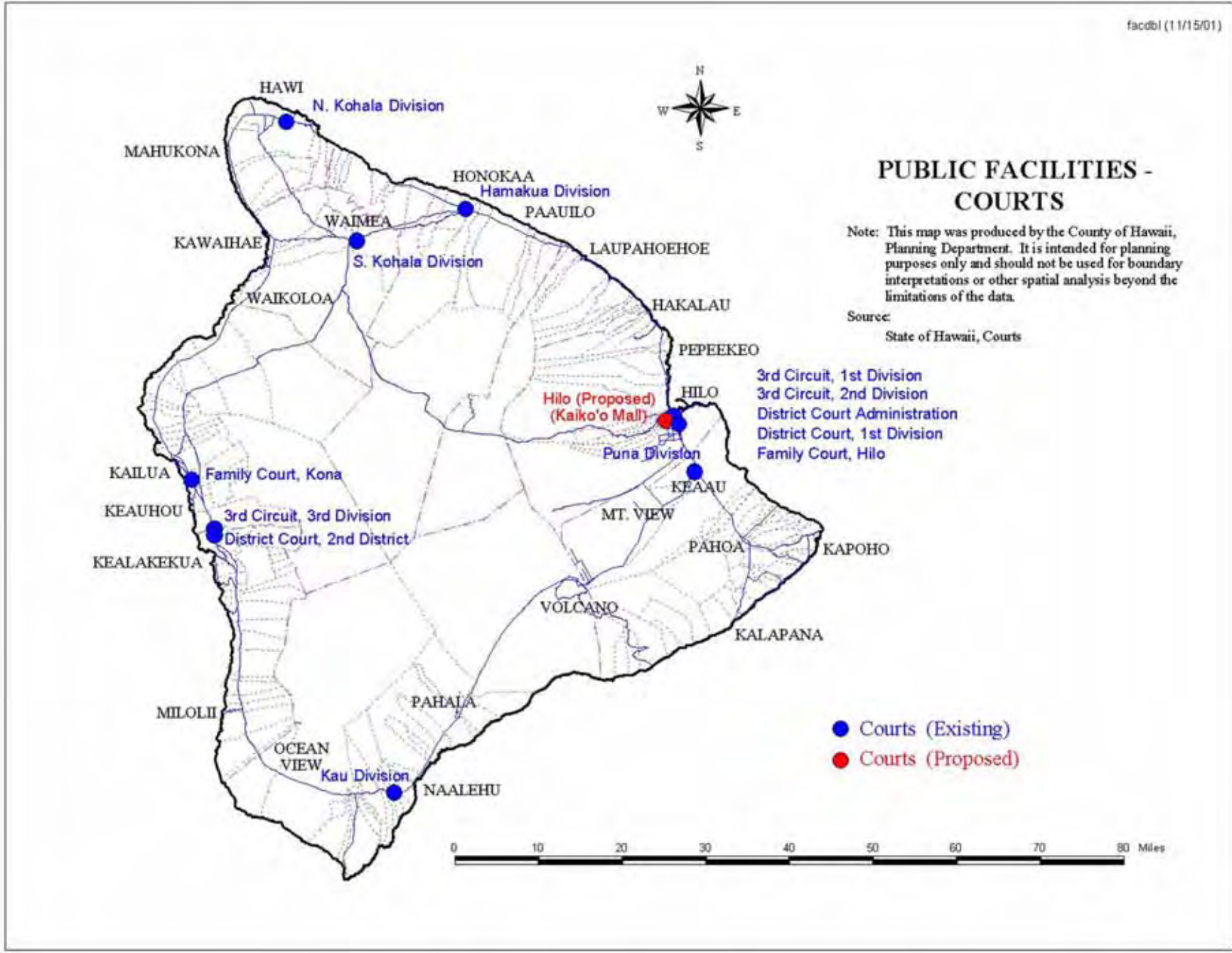


Figure 33. Public Facilities - Courts

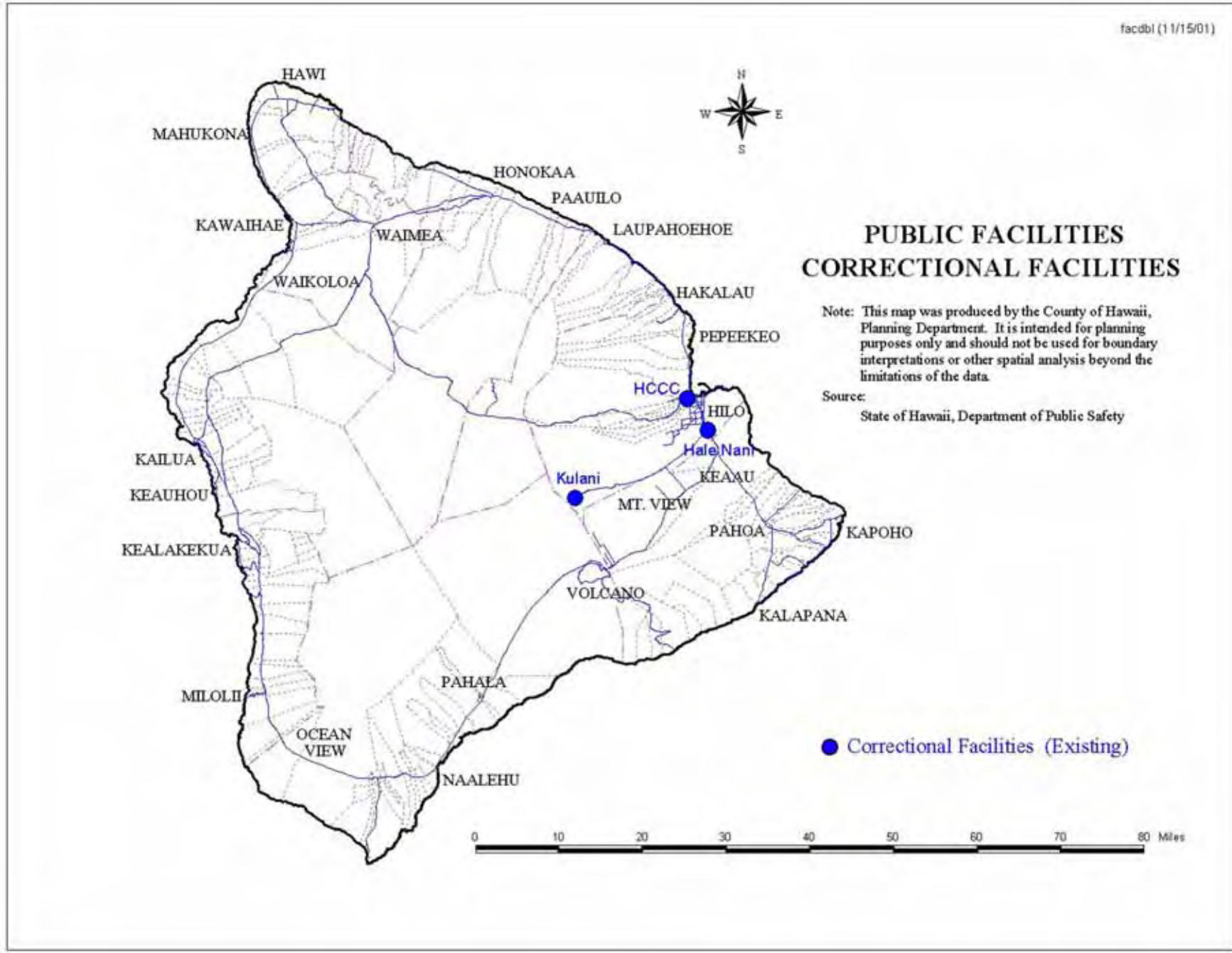


Figure 34. Public Facilities - Correctional Facilities

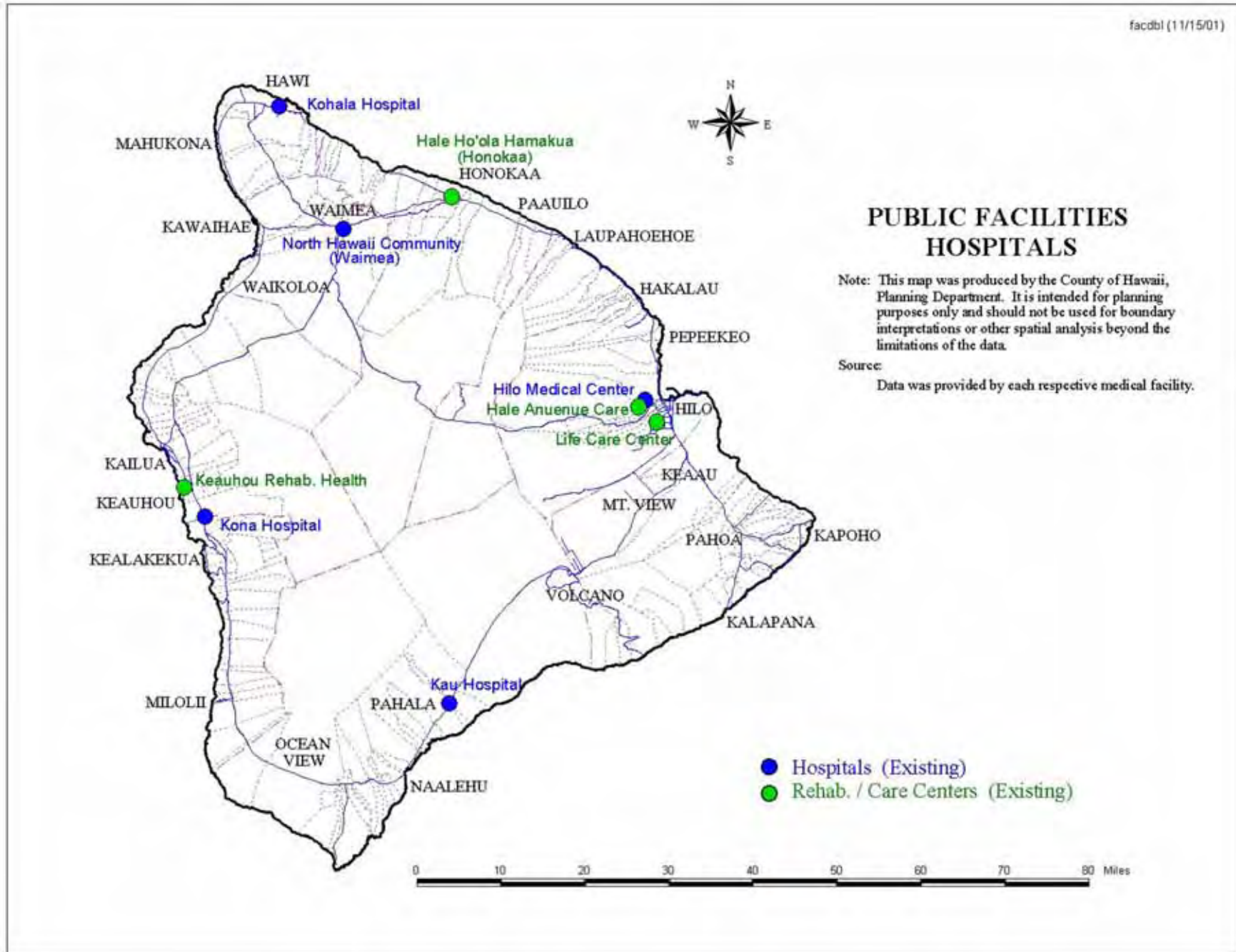


Figure 35. Public Facilities - Hospitals

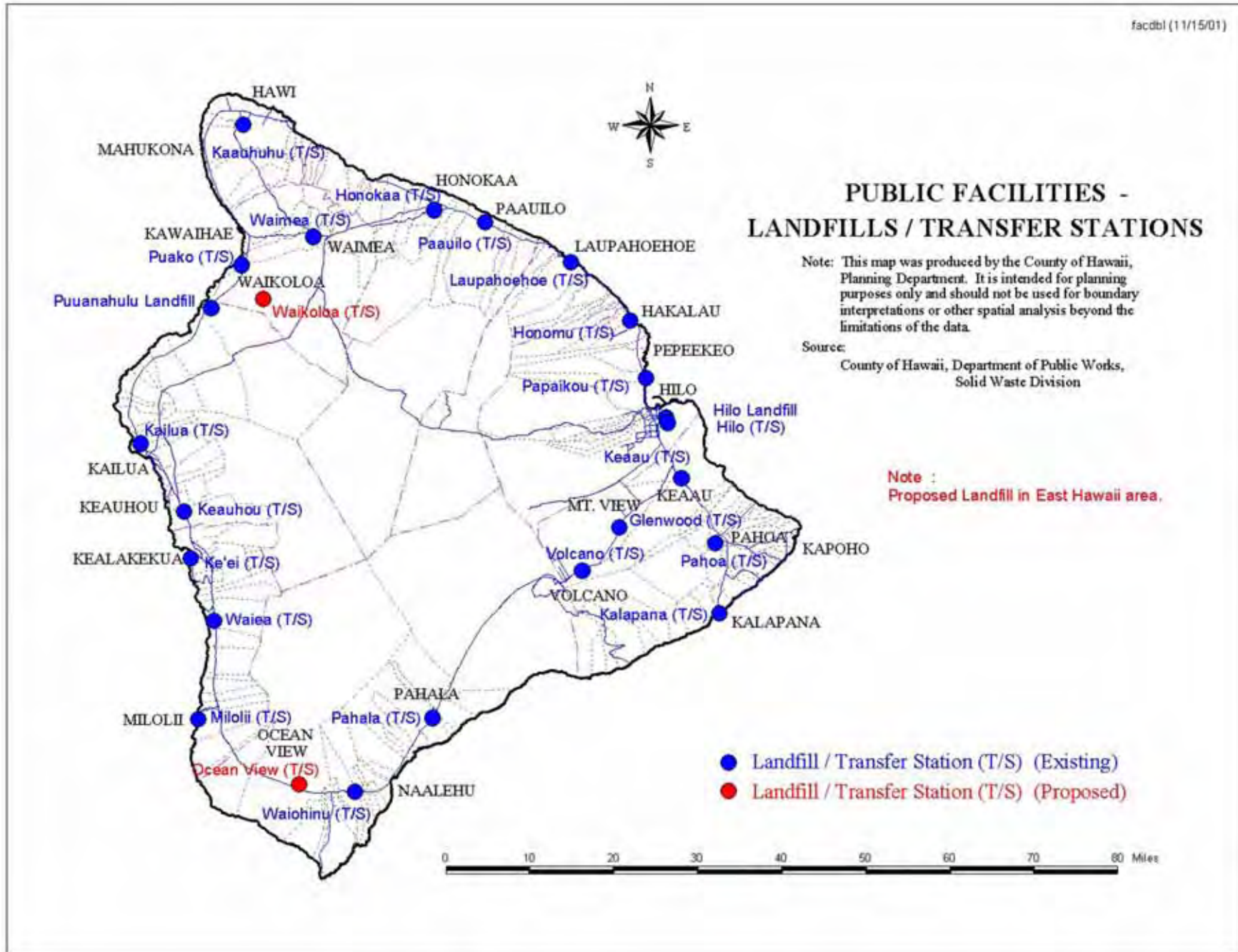


Figure 36. Public Facilities - Landfills/Transfer Stations

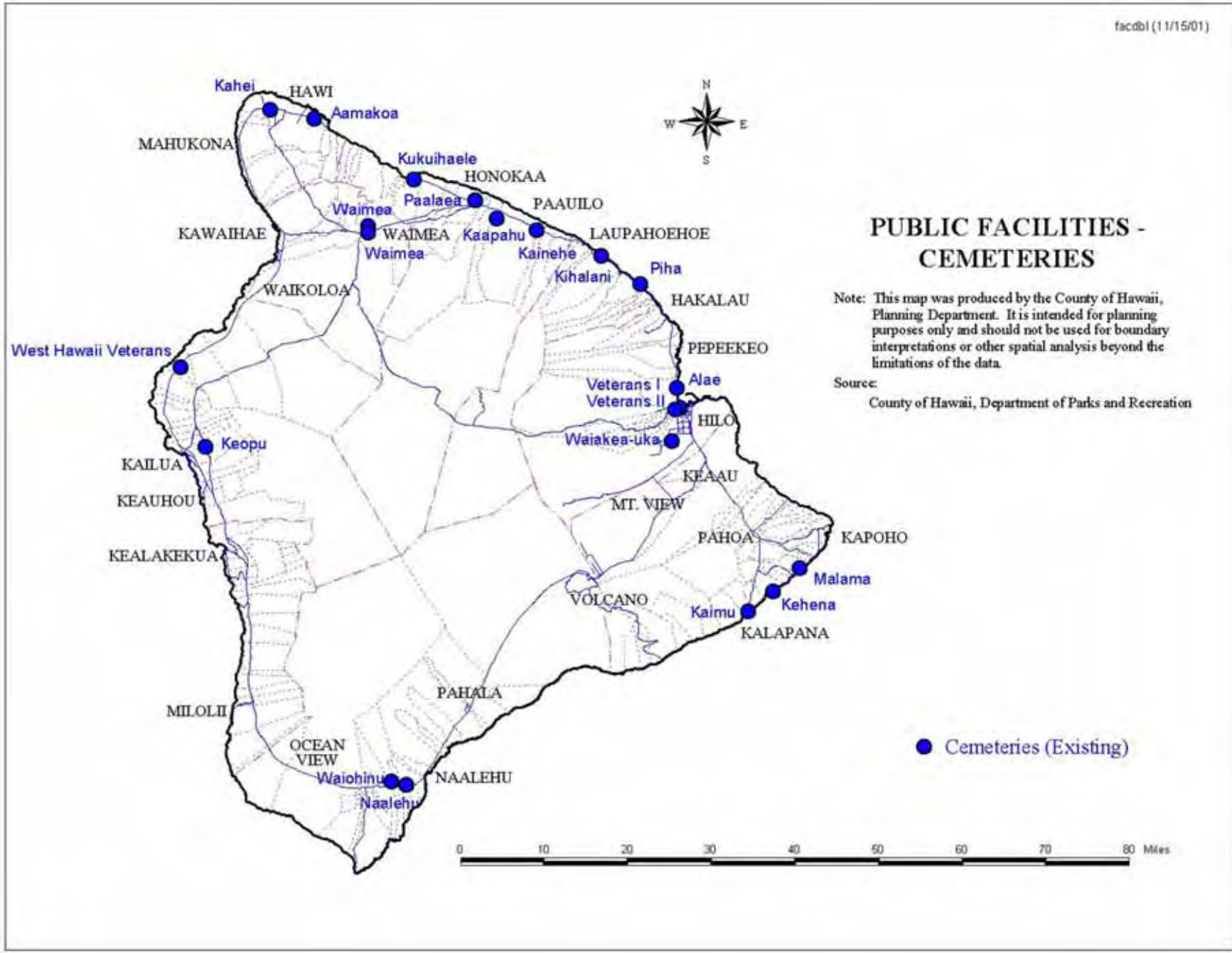


Figure 37. Public Facilities - Cemeteries

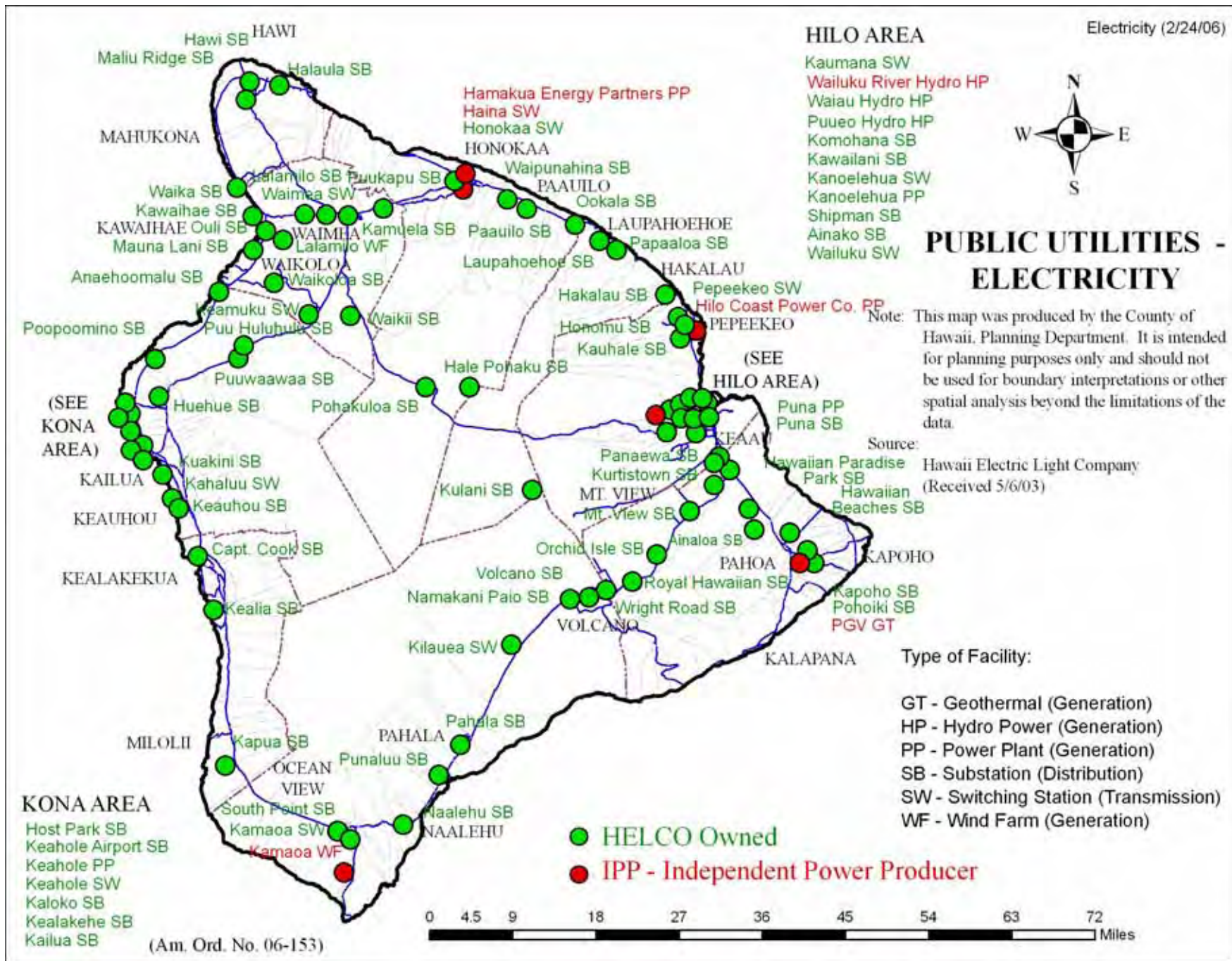


Figure 38. Public Utilities - Electricity

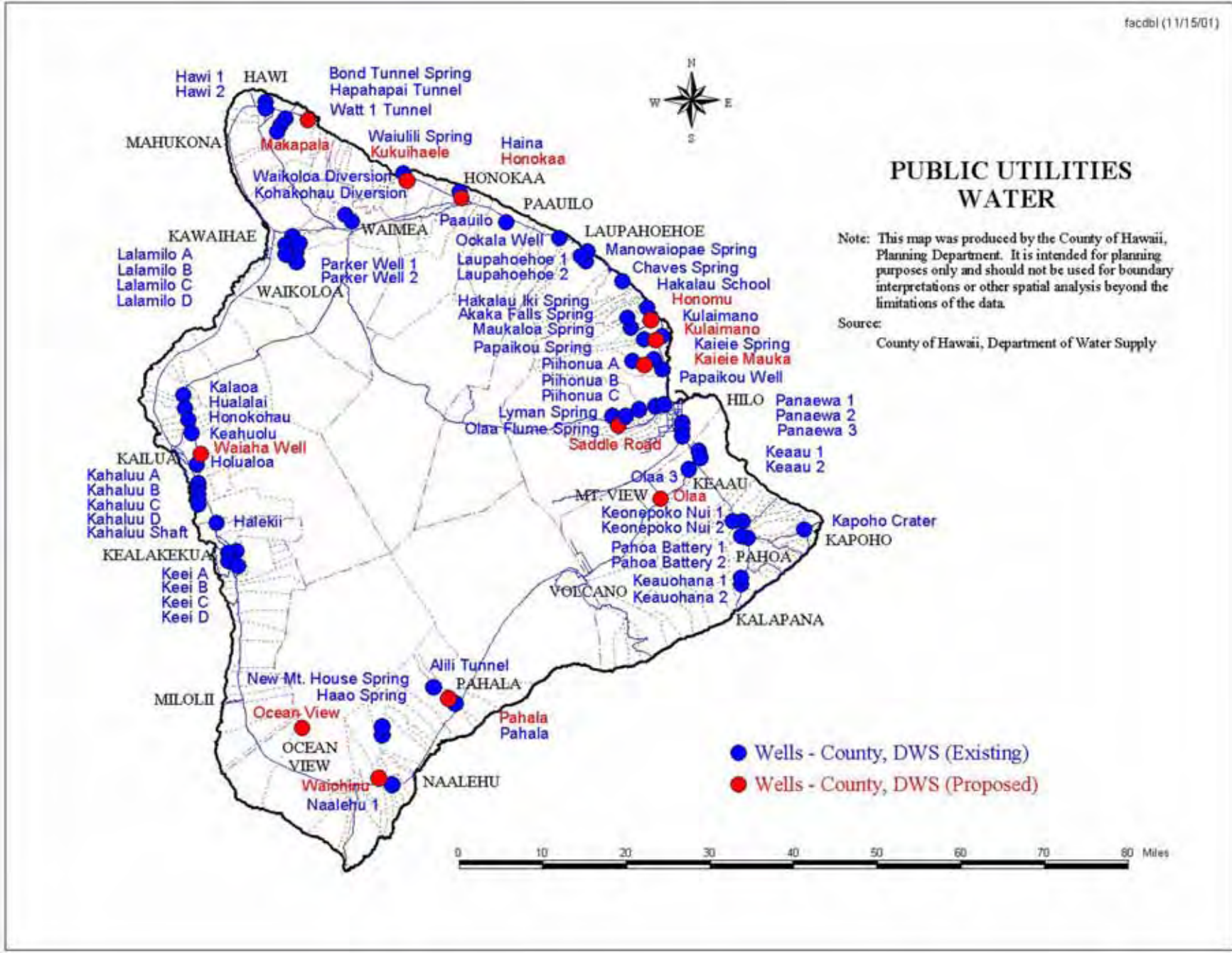


Figure 39. Public Utilities - Water

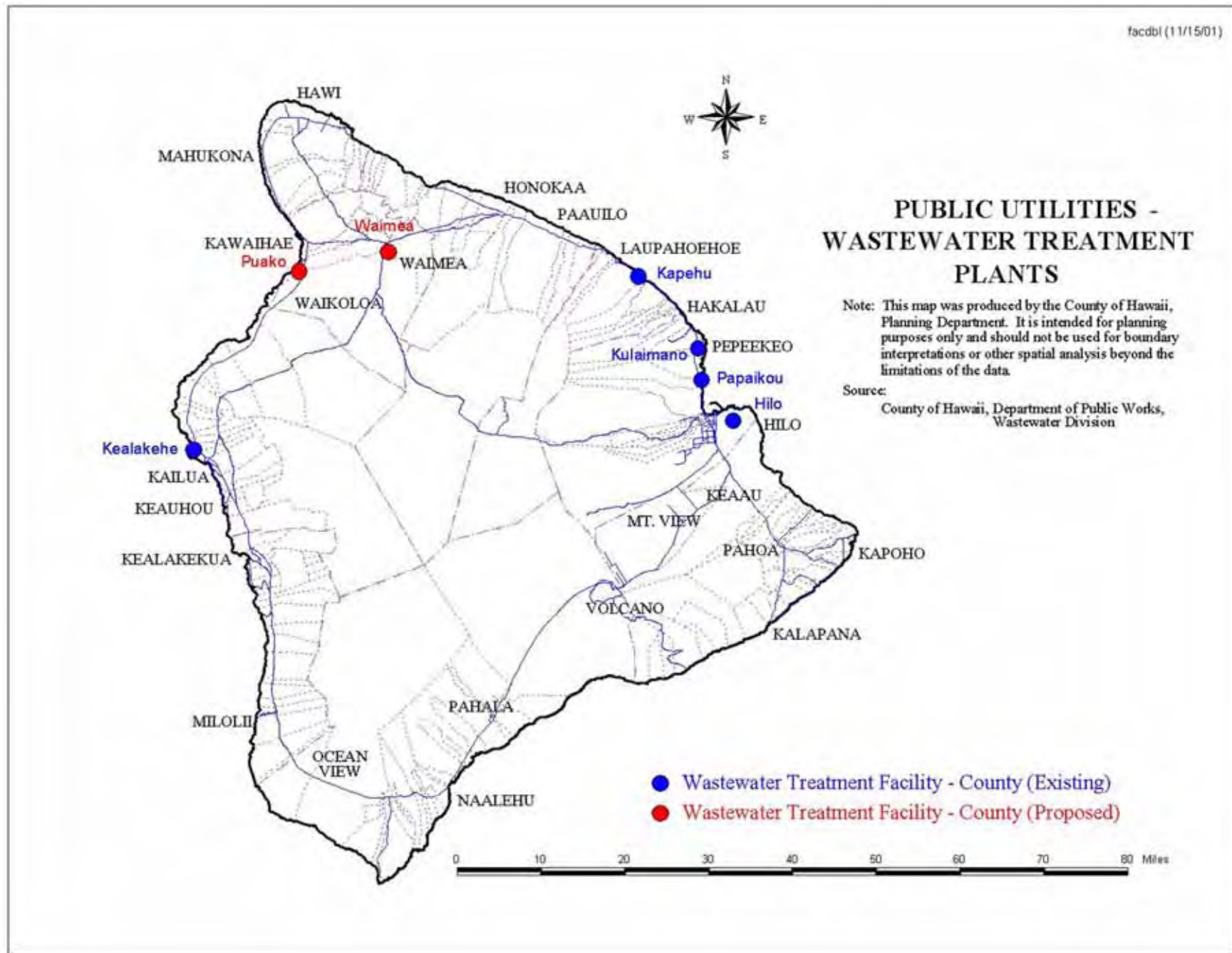


Figure 40. Public Utilities - Wastewater Treatment Plants

RECREATION COUNTY PARKS

Note: This map was produced by the County of Hawaii, Planning Department. It is intended for planning purposes only and should not be used for boundary interpretations or other spatial analysis beyond the limitations of the data.

Source: County of Hawaii, Department of Parks and Recreation

HILO AREA

- Carlsmith Ocean Park Beach
- Coconut Island (Mokuola)
- Hilo Bayfront Canoe
- Ice Pond
- James Kealoha Beach Park
- Kuhio Bay (Bakers Beach)
- Lehia Beach Park
- Lelewi Beach Park
- Lihikai (Onakahakaha) Beach Park
- Liliuokalani Gardens
- Reed's Bay
- Richardson Ocean Park Beach
- Ahualani Park
- Ainako Park
- Ainola Park
- Lincoln Park
- Lokahi Park
- Mohouli Park
- University Heights Park
- Clem Akina Park
- Hilo Bayfront Park
- Hualani Park/Kawanakoa Gym
- Kalakaua Park
- Kamama Senior Center
- Keikiland Playground
- Malama Park
- Mooheau Park
- Panaewa Park
- Pomaikai Senior Center
- Waiakea-Uka Gym/Park
- Waiakeawaena Playground
- E. Hawaii Cultural Center
- Gilbert Carvalho Park
- Hilo Armory
- Hilo Bayfront Soccer Fields
- Hoolulu Park
- Lincoln Tennis Courts
- Municipal Golf Course
- NAS Swimming Pool
- Panaewa Drag Strip
- Skiet Range
- Waiakea Recreation Center

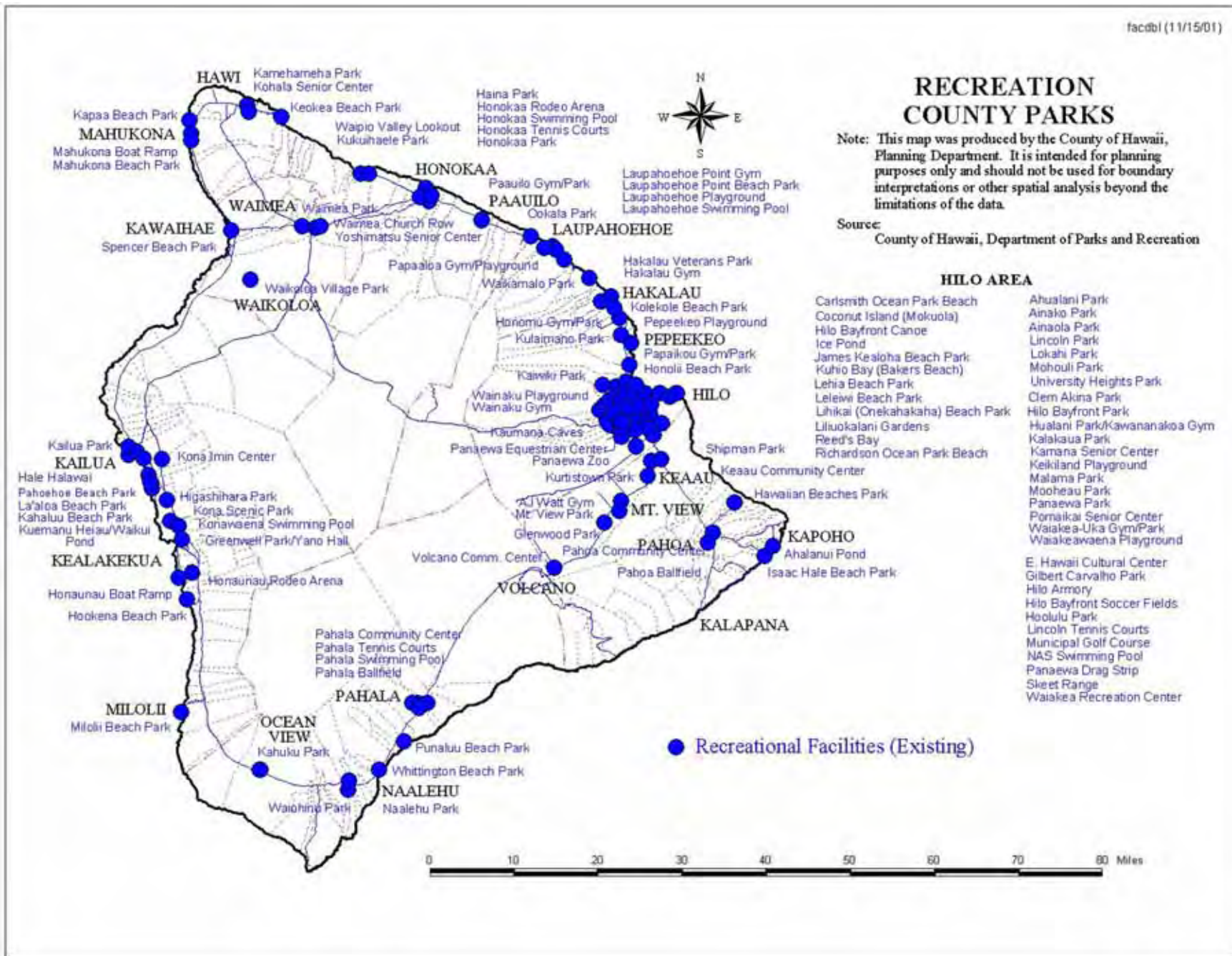


Figure 41. Recreation - County Parks

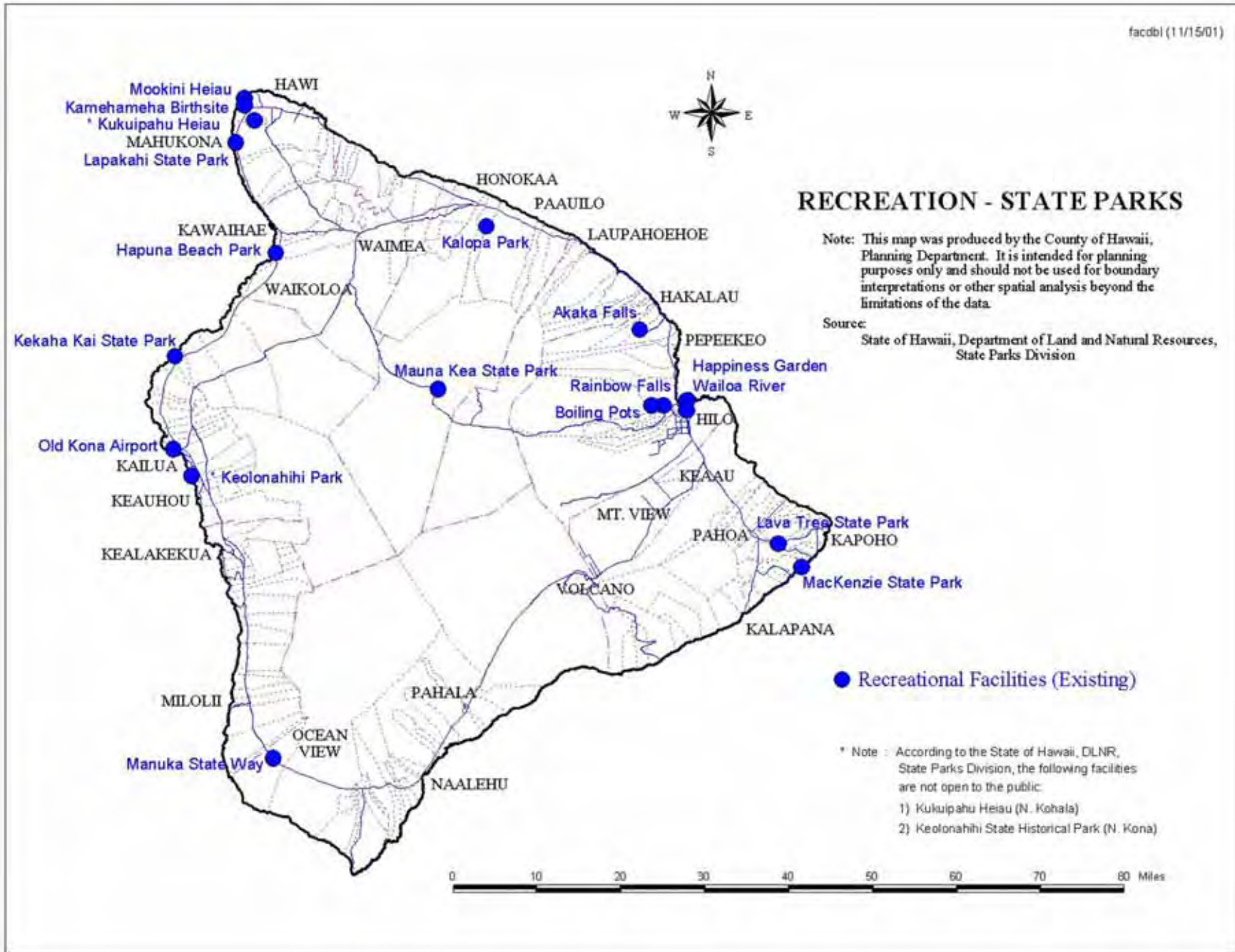


Figure 42. Recreation - State Parks

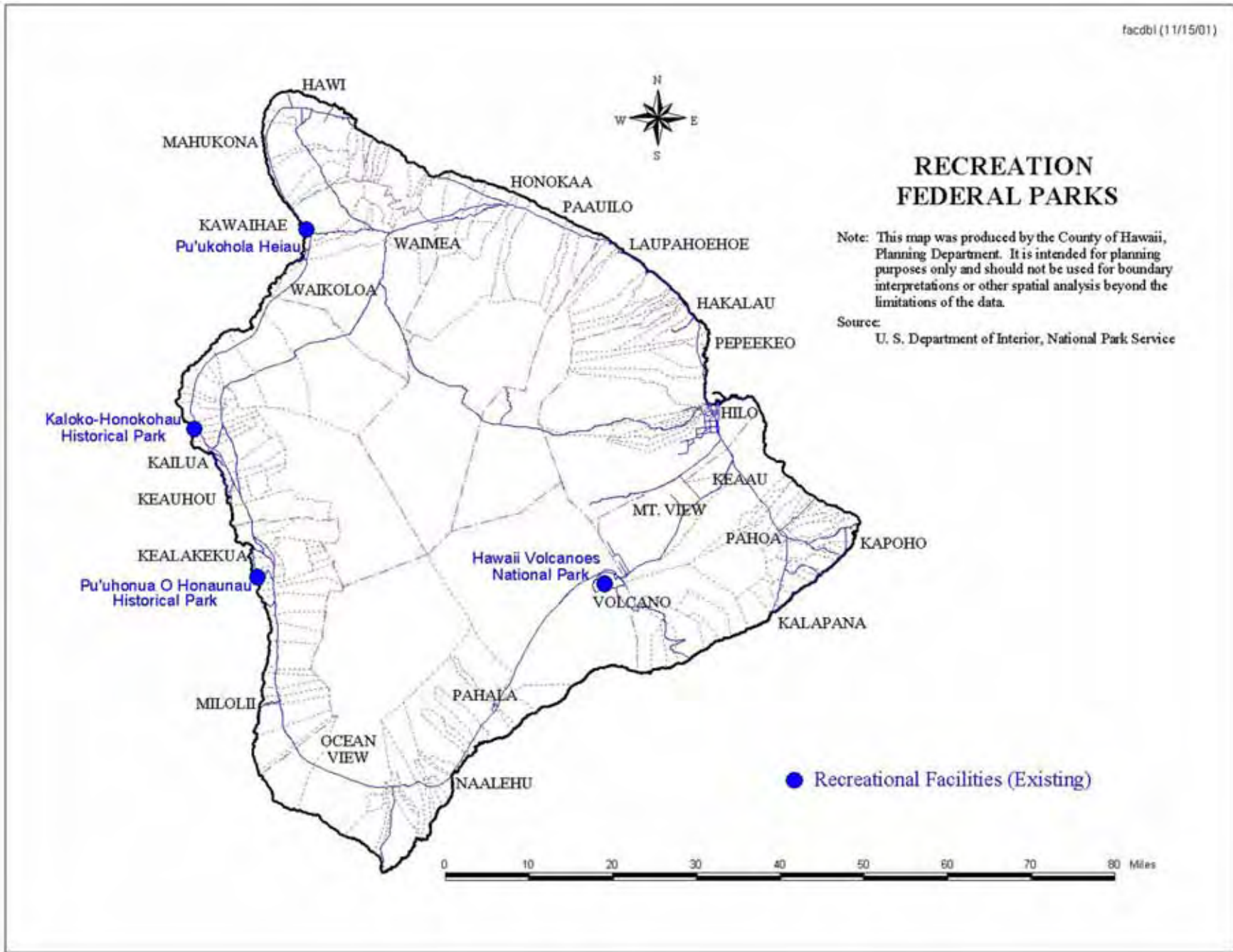


Figure 43. Recreation - Federal Parks

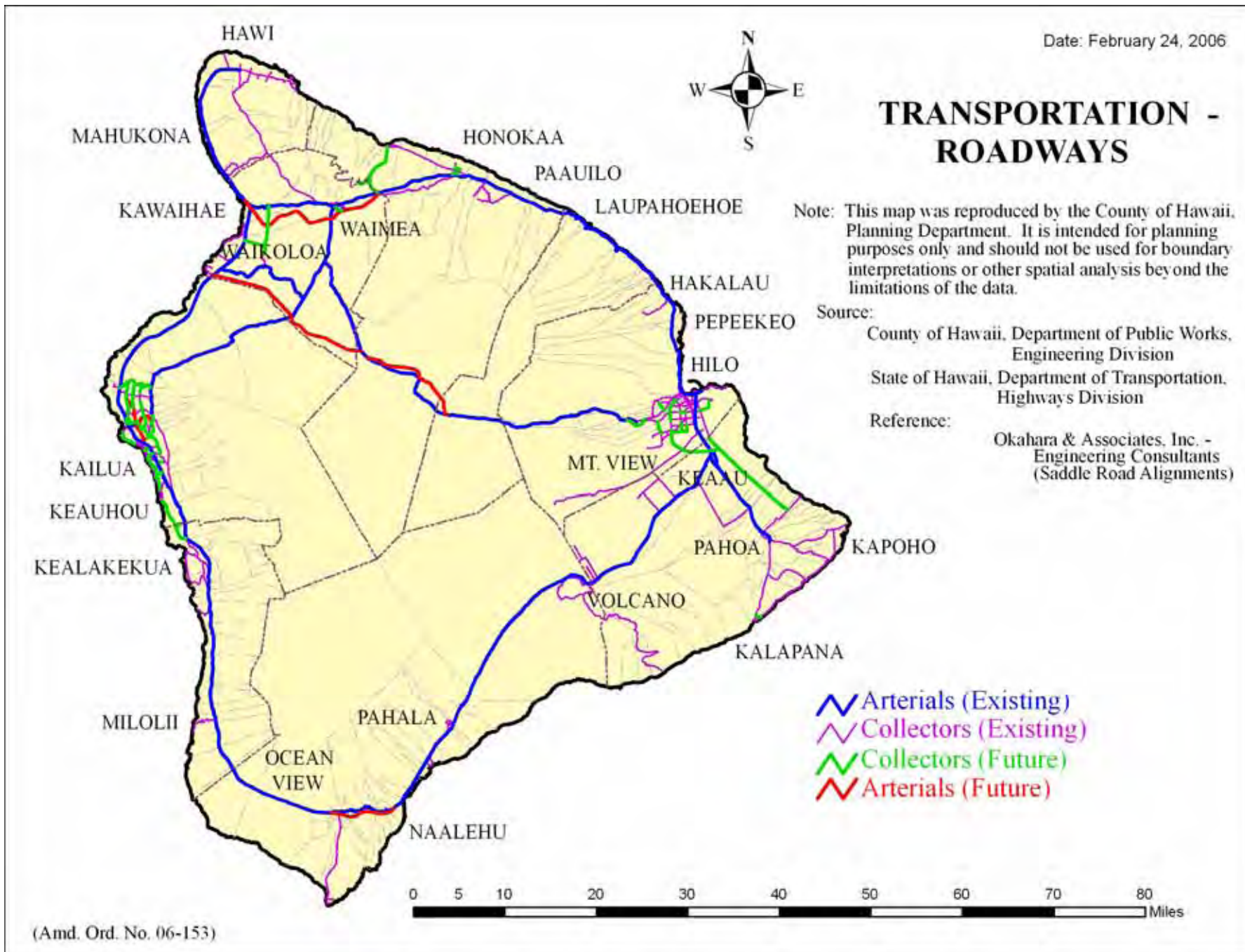


Figure 44. Transportation - Roadways (Islandwide)

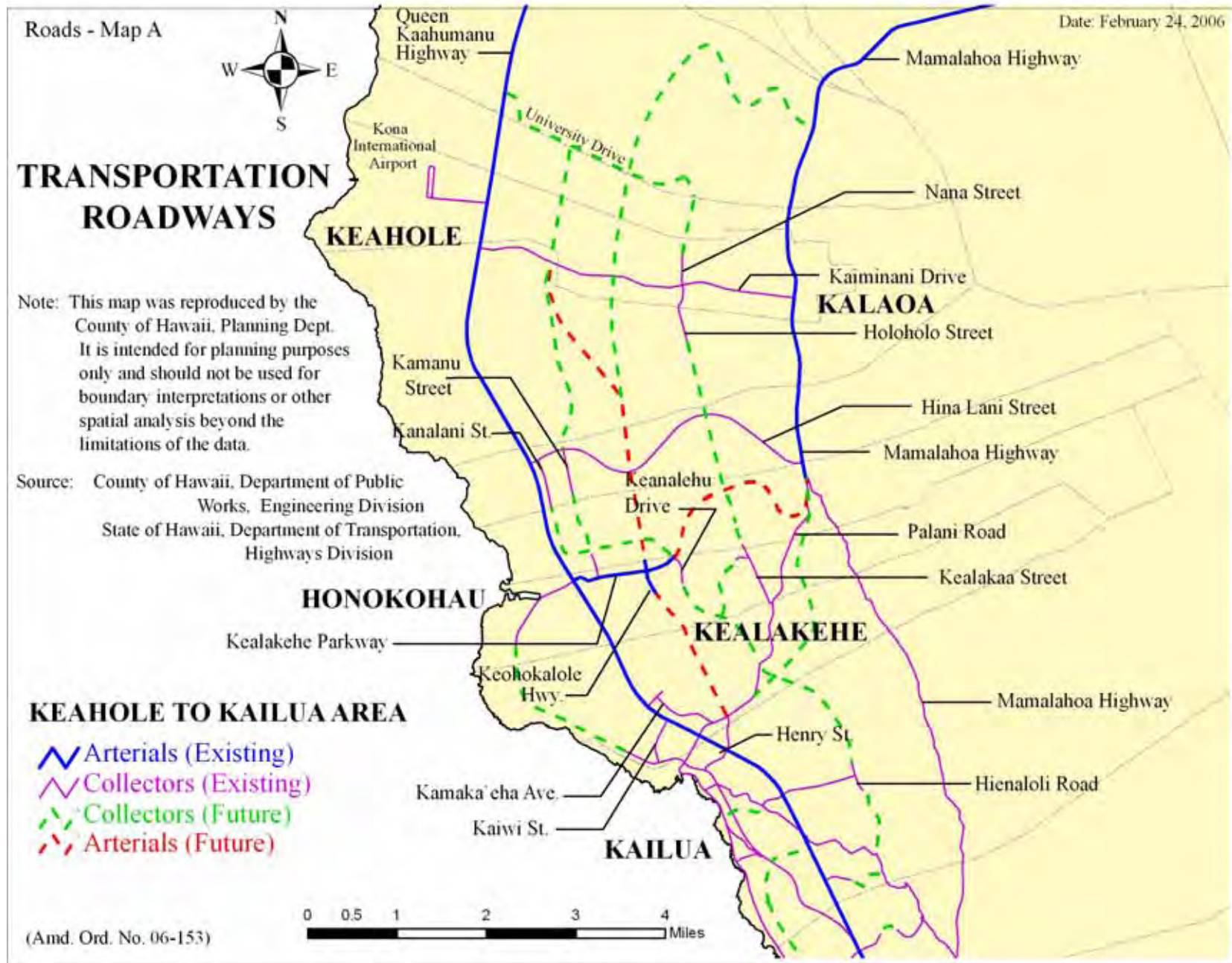


Figure 45. Transportation - Roadways (Keahole to Kailua)

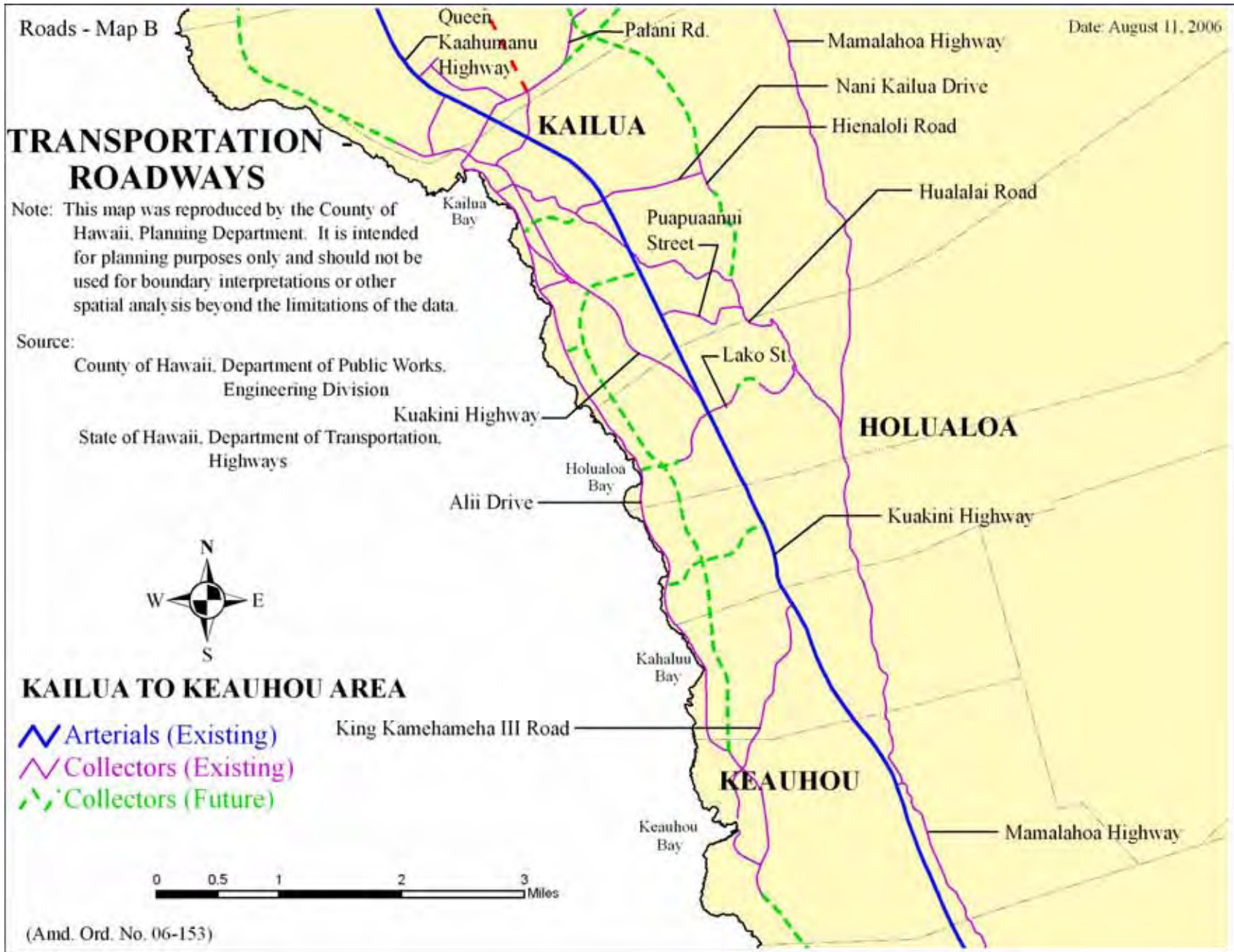


Figure 46. Transportation - Roadways (Kailua to Keauhou)

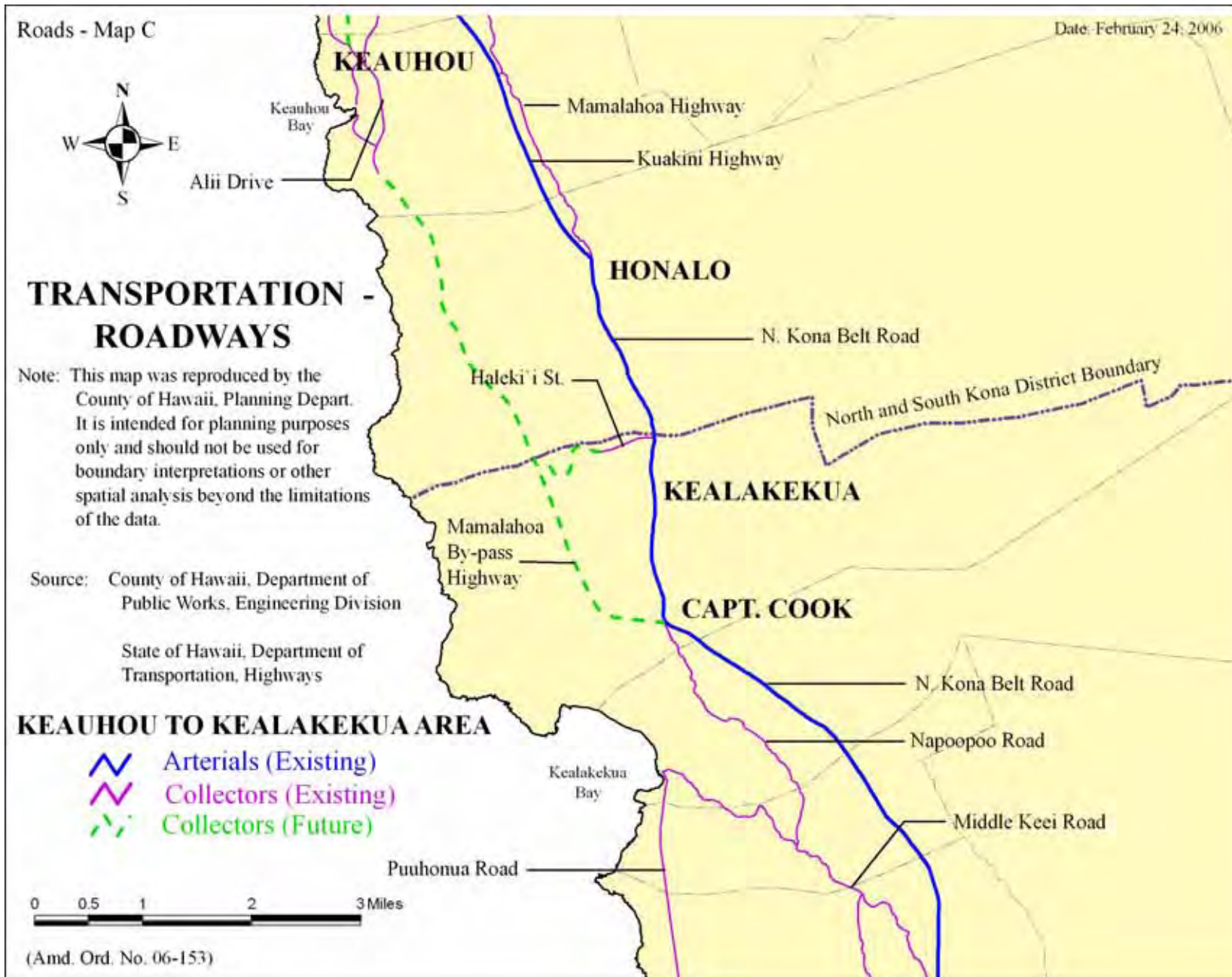


Figure 47. Transportation - Roadways (Keauhou to Kealahou)

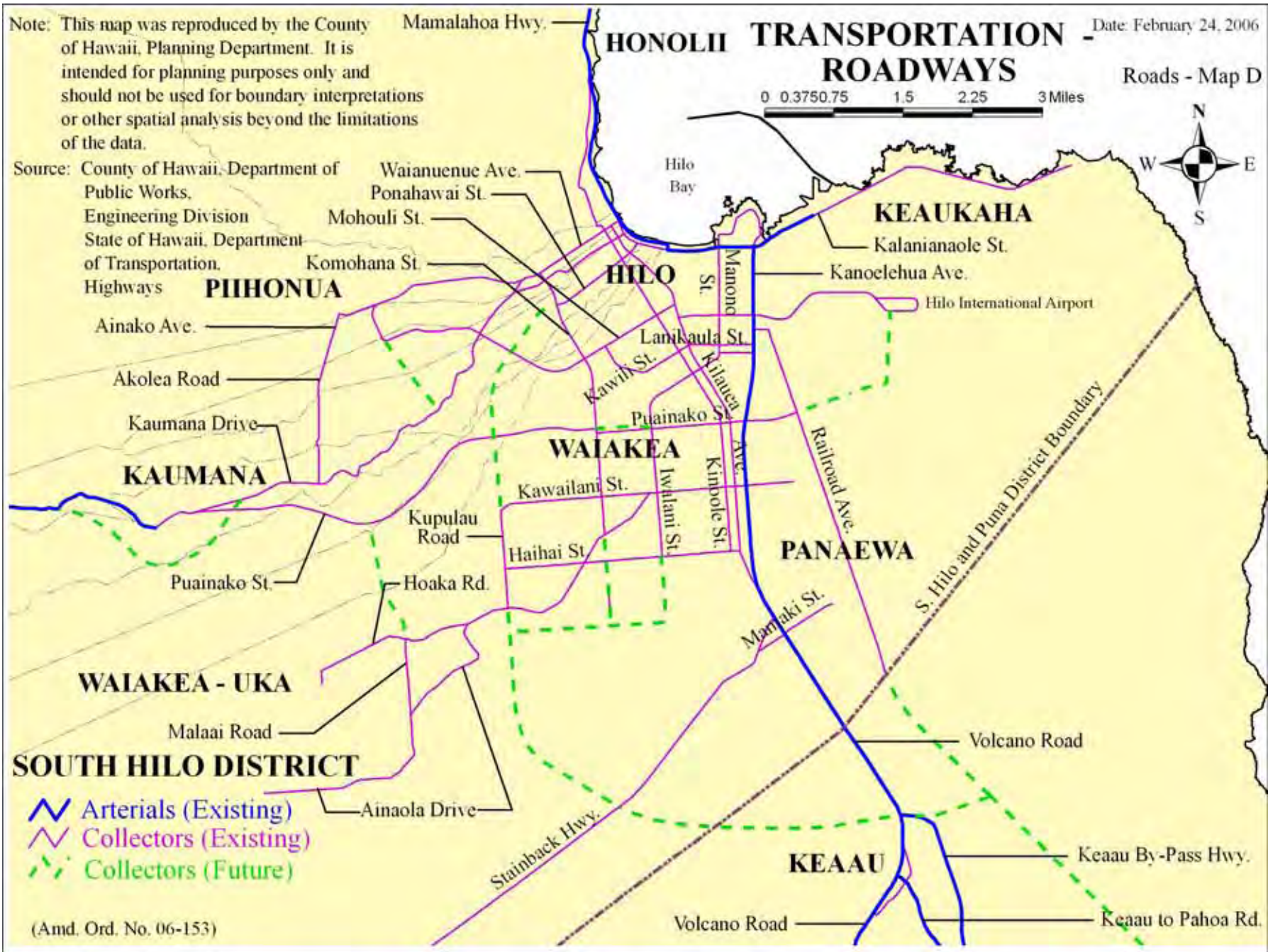


Figure 48. Transportation - Roadways (South Hilo District)

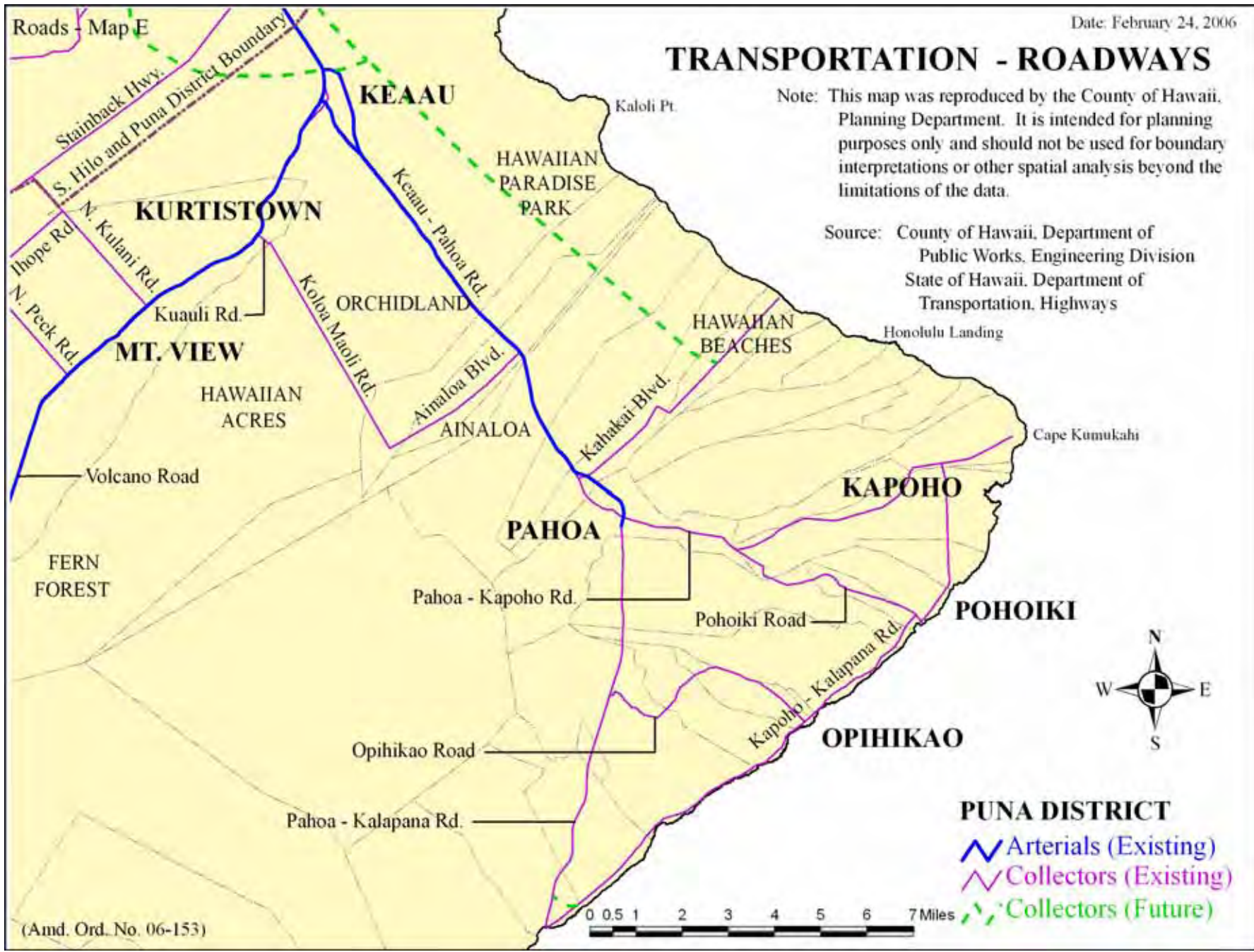


Figure 49. Transportation - Roadways (Puna District)

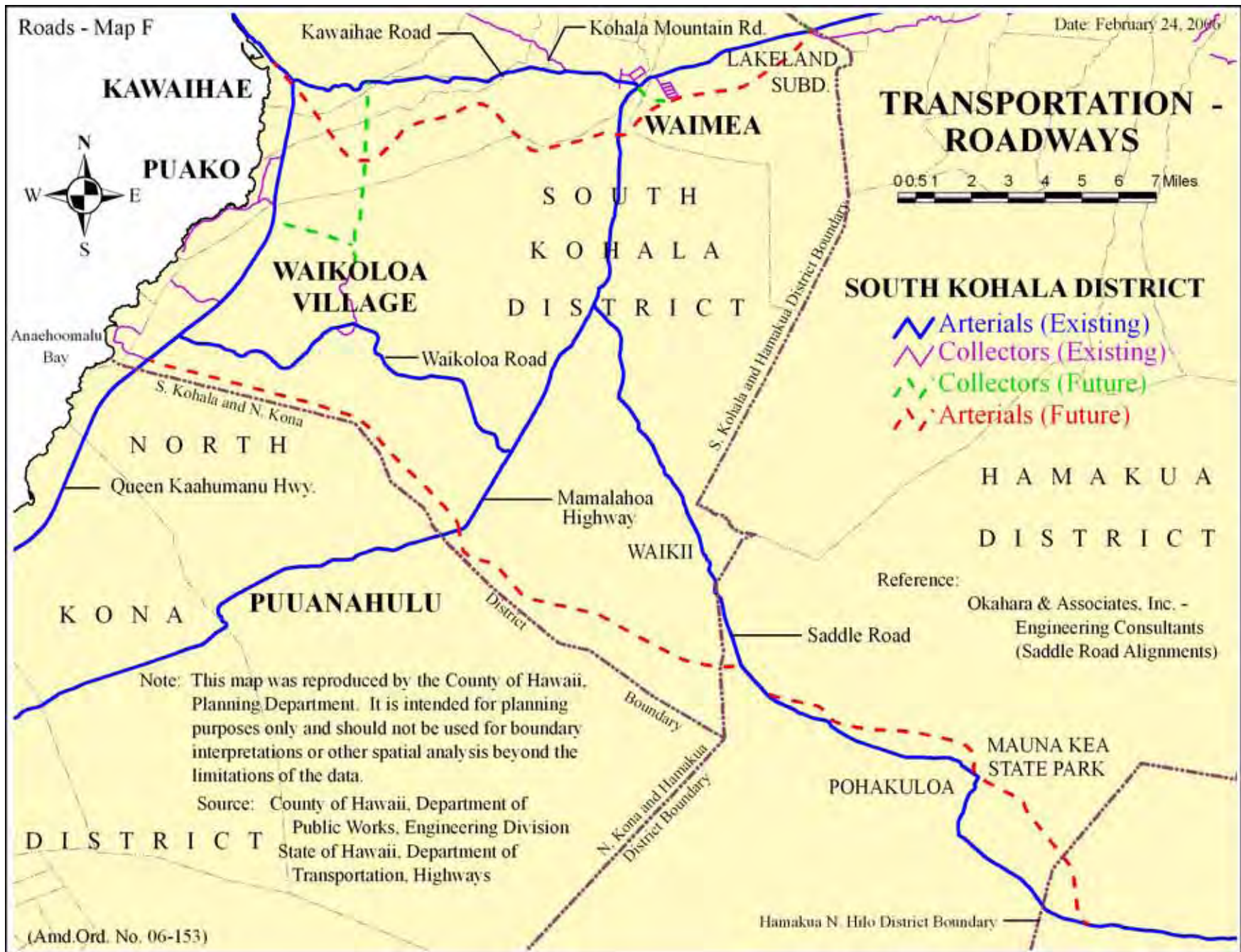
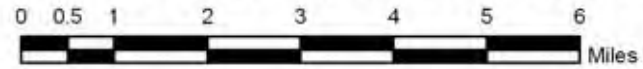


Figure 50. Transportation - Roadways (South Kohala District)

HAMAKUA DISTRICT

-  Arterials (Existing)
-  Collectors (Existing)
-  Collectors (Future)
-  Arterials (Future)

TRANSPORTATION - ROADWAYS



Note: This map was reproduced by the County of Hawaii, Planning Department. It is intended for planning purposes only and should not be used for boundary interpretations or other spatial analysis beyond the limitations of the data.

Source:
 County of Hawaii, Department of Public Works,
 Engineering Division
 State of Hawaii, Department of Transportation,
 Highways



(Amd. Ord. No. 06-153)

Figure 51. Transportation - Roadways (Hamakua District)

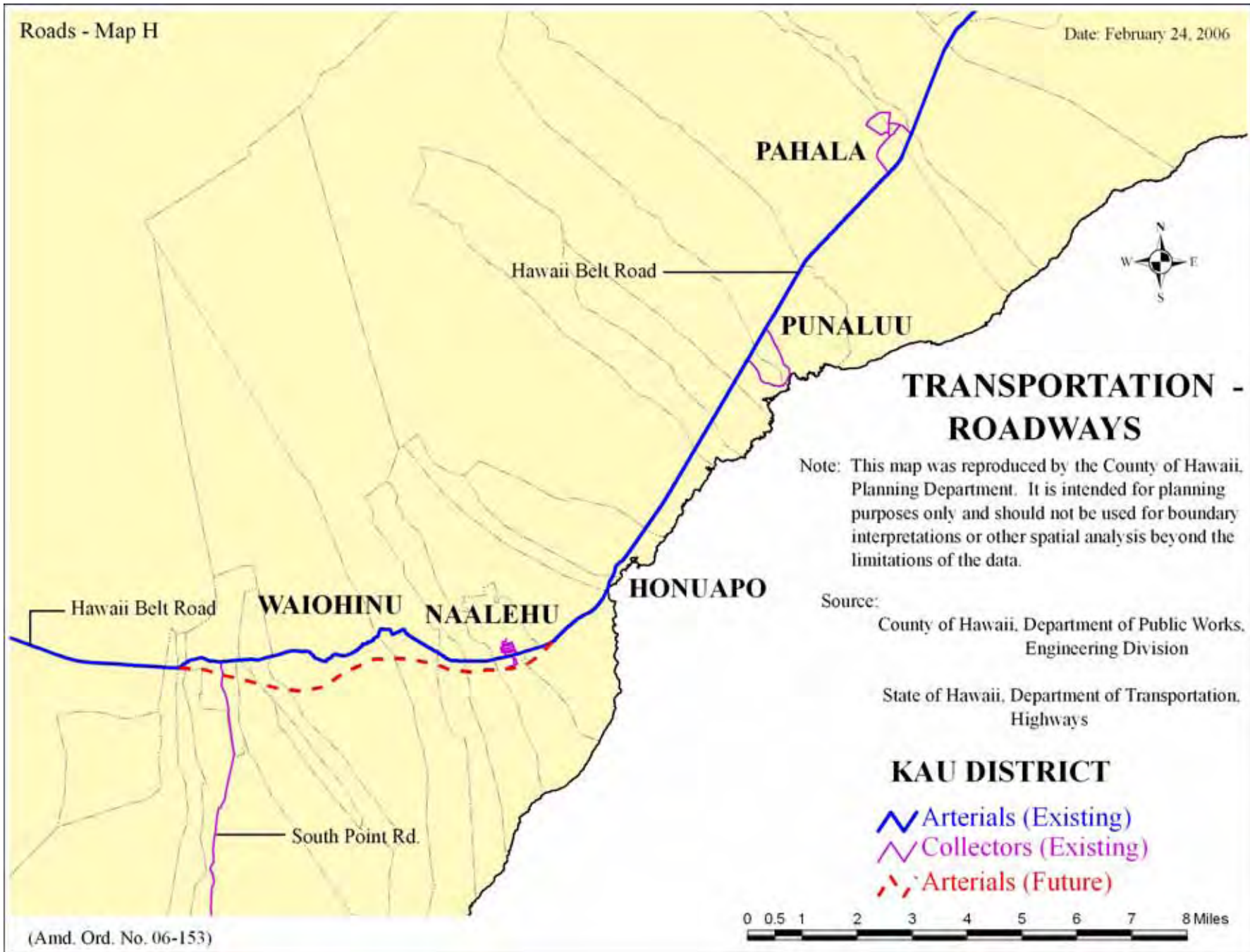


Figure 52. Transportation - Roadways (Ka'u District)

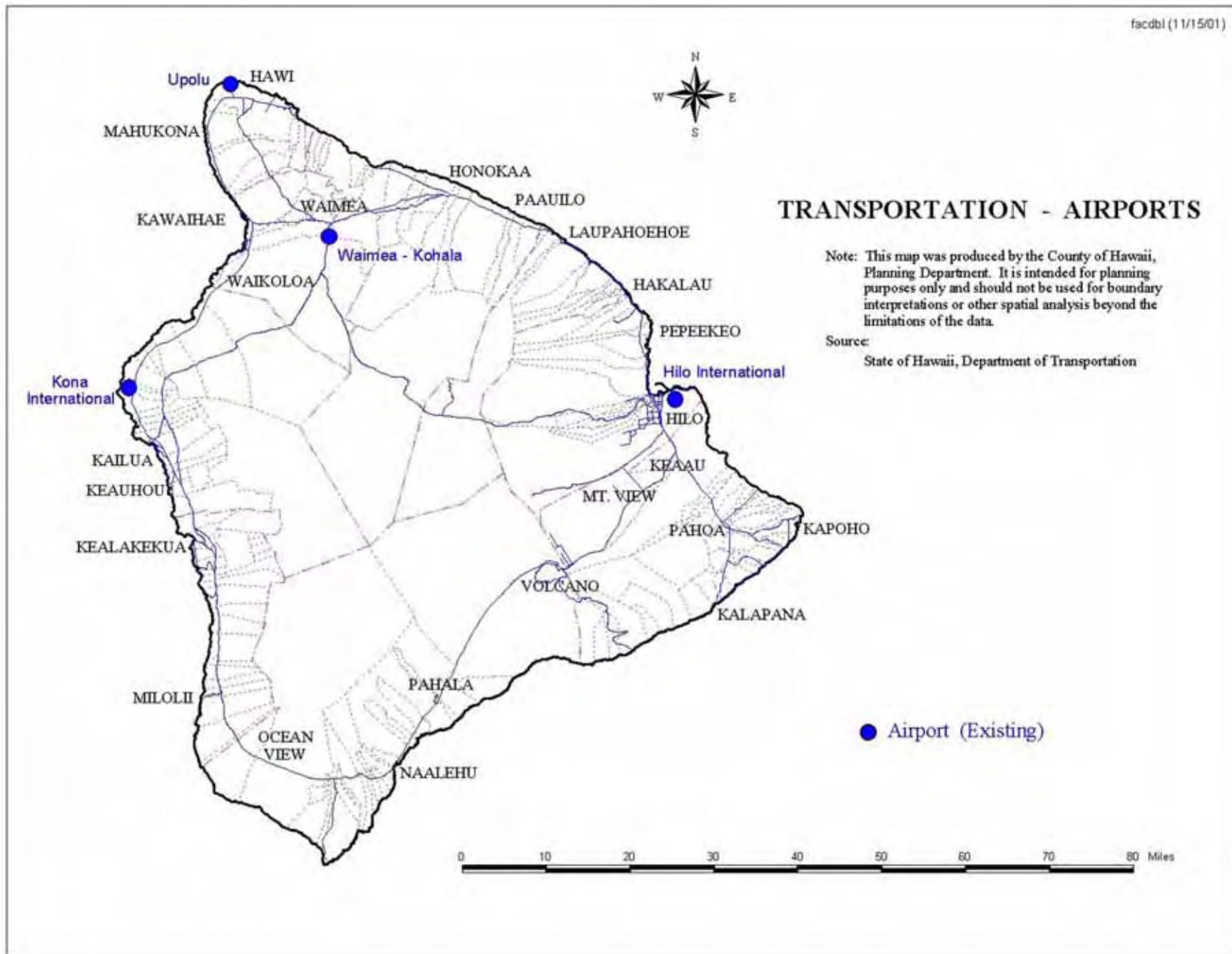


Figure 53. Transportation - Airports

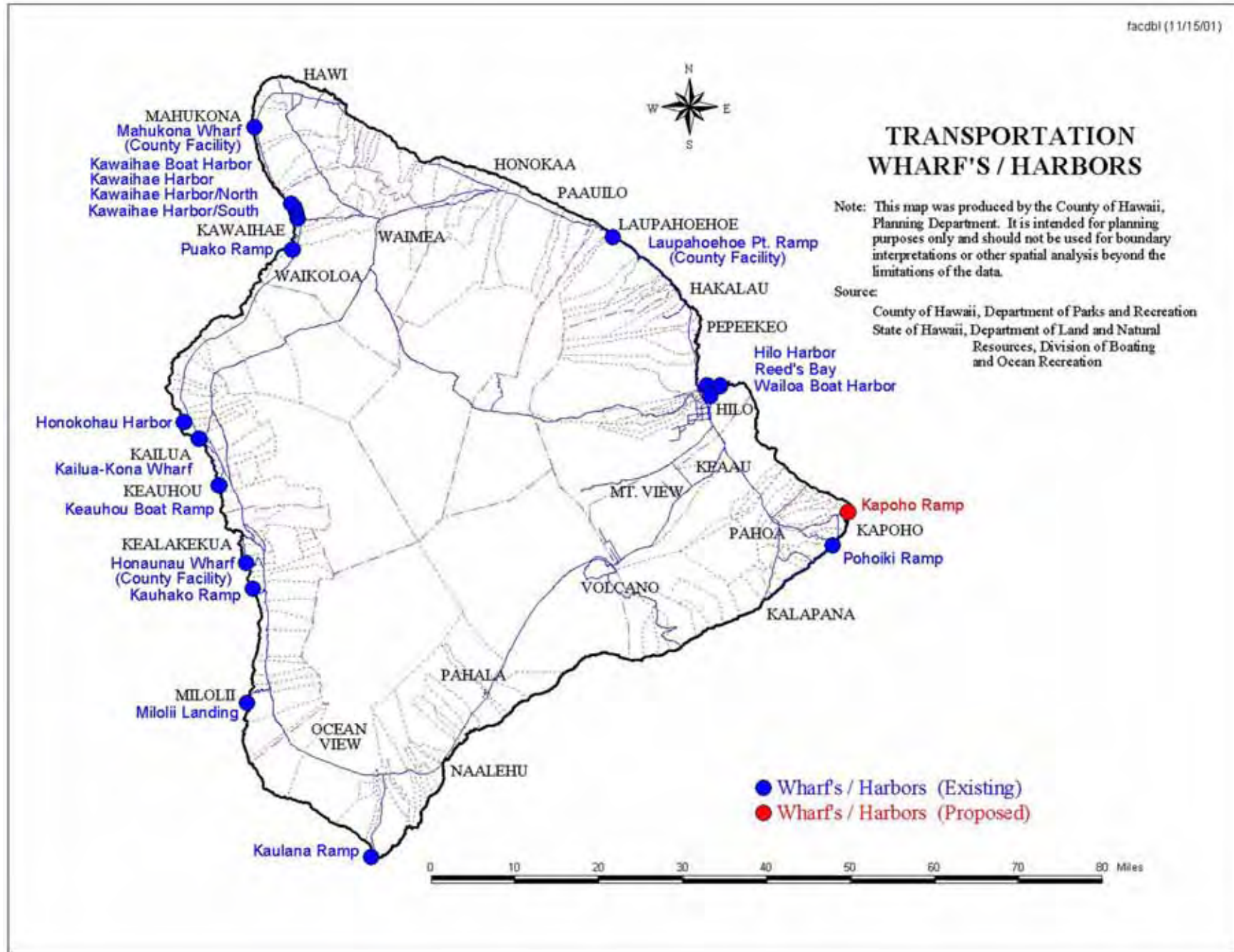


Figure 54. Transportation - Wharfs/Harbors

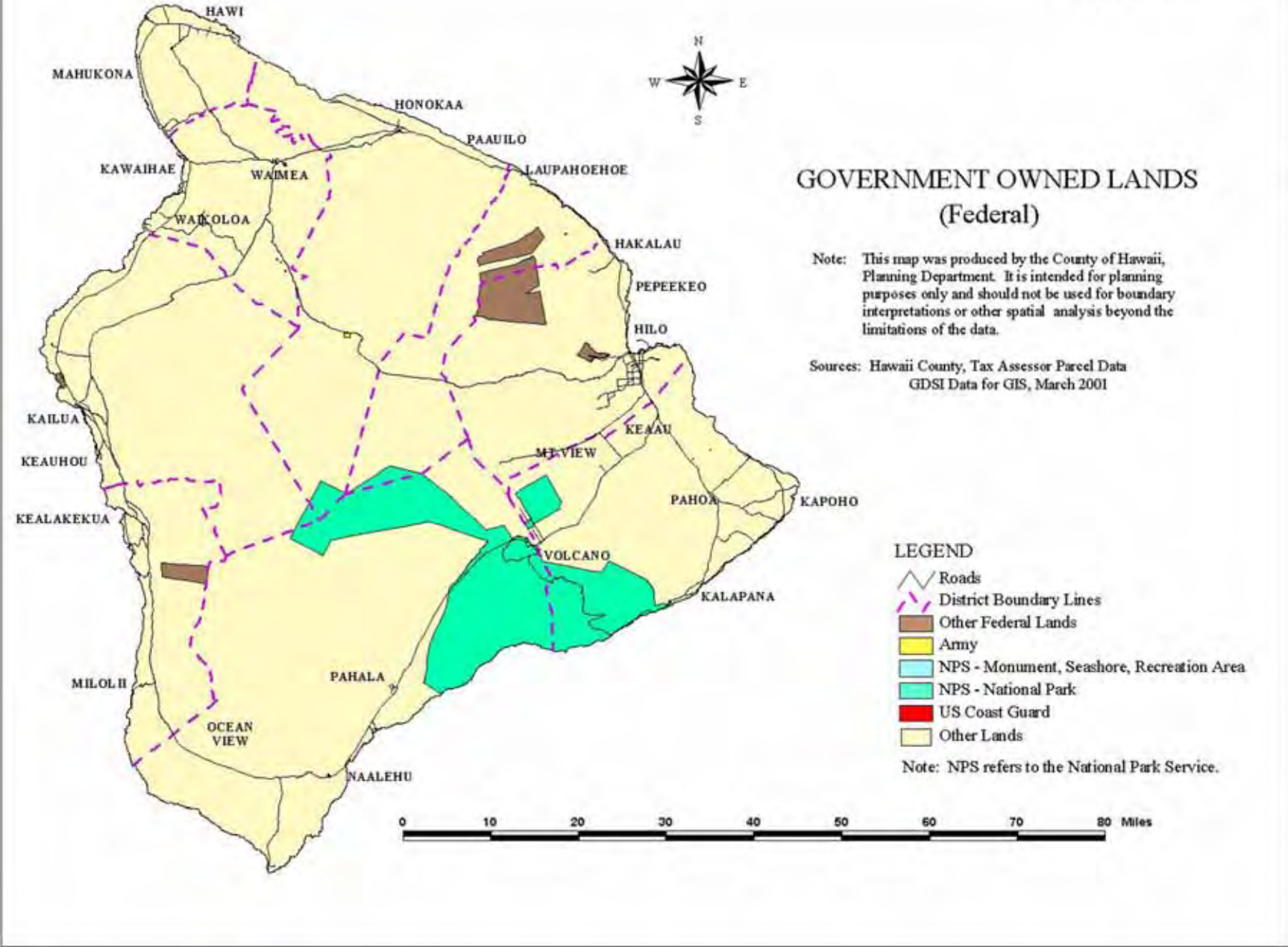


Figure 55. Government Owned Lands (Federal)

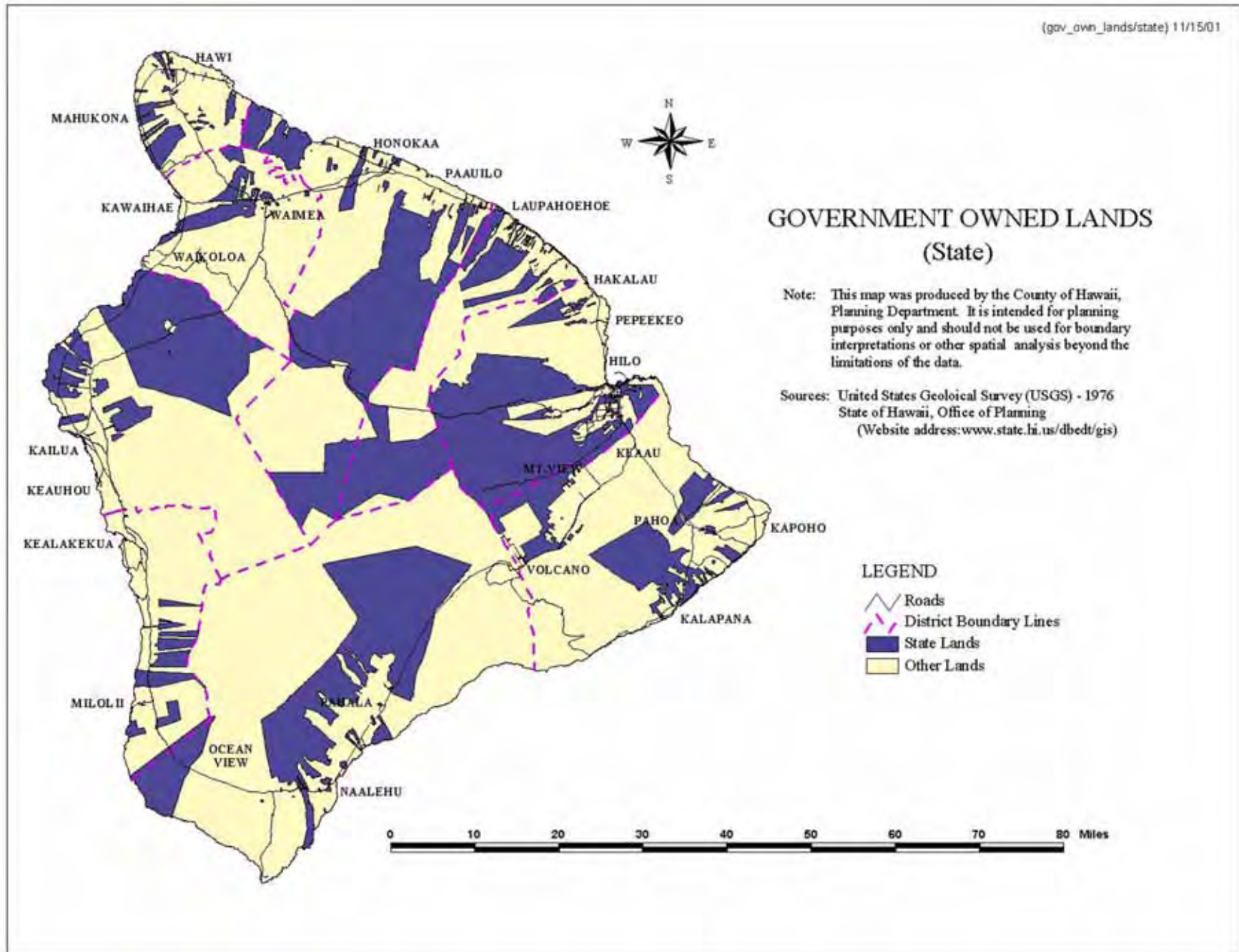


Figure 56. Government Owned Lands (State)

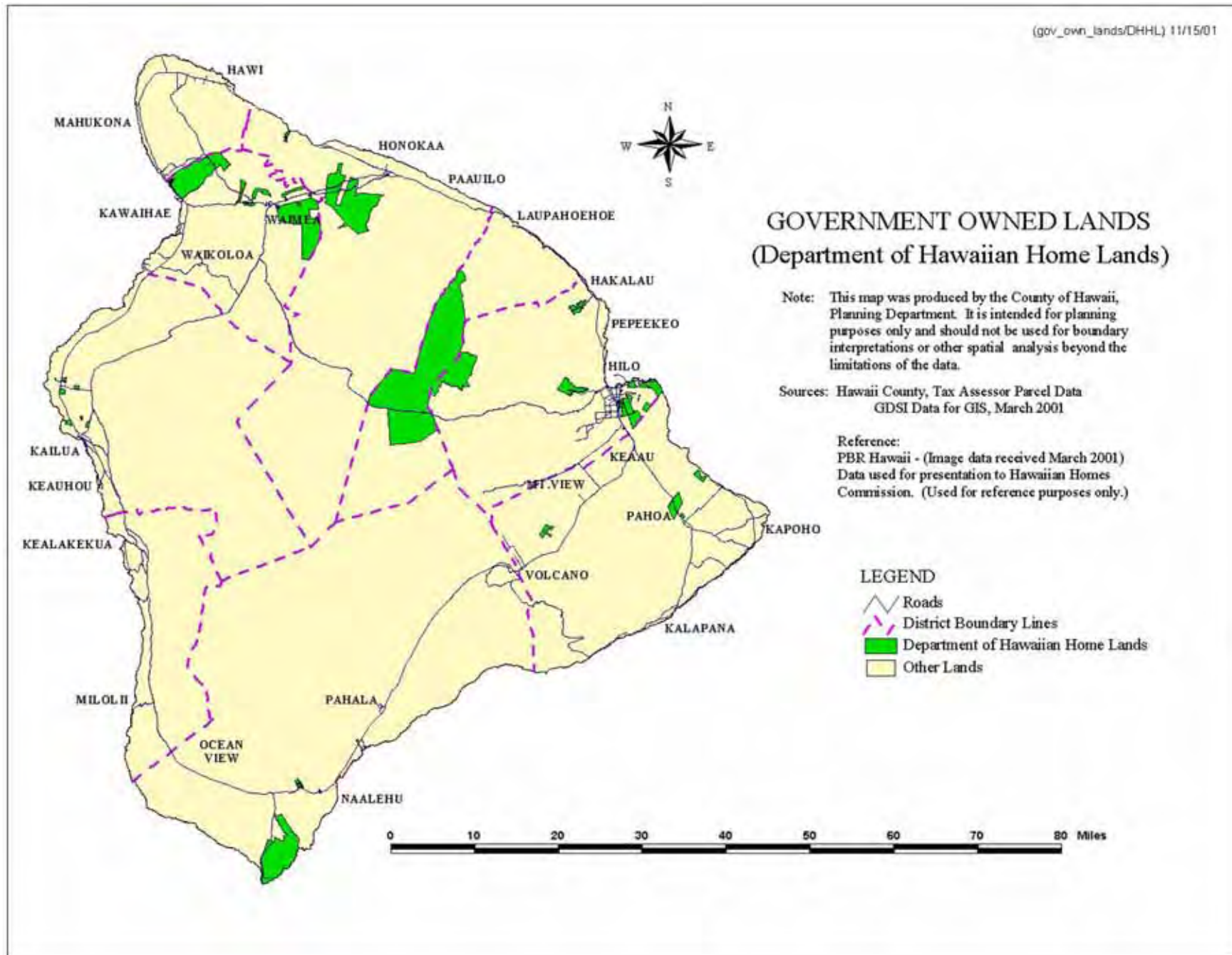


Figure 57. Government Owned Lands (DHHL)

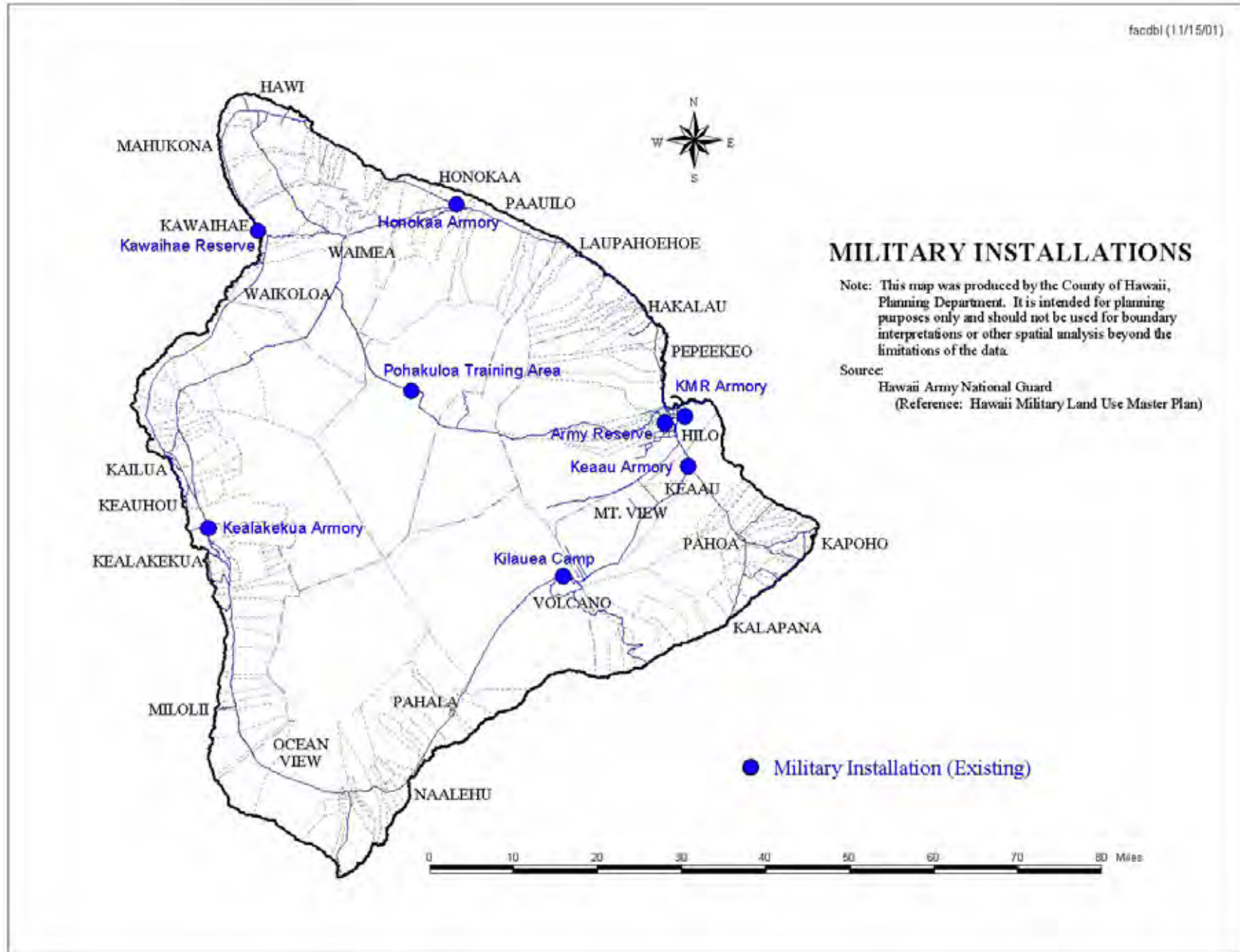


Figure 58. Military Installations

